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EXPORT OF SOLID NON-HAZARDOUS WASTE FROM ONTARIO

OCTOBER 1993

Ontario

Ministry of
Environment
and Energy

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EXPORT OF SOLID NON-HAZARDOUS WASTE FROM ONTARIO

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PIBS 2725

EXPORT OF SOLID NON-HAZARDOUS WASTE FROM ONTARIO

Report prepared by:

Gartner Lee Limited
in association with
Ernst & Young Management Consultants

June 25, 1993

GLL 92–304

Ontario Ministry of Environment and Energy
135 St. Clair Avenue West
Suite 100
Toronto, Ontario
M4V 1P5

Attention: Mr. Paul Scale
Manager, Waste Reduction Office

Dear Mr. Scale:

Re: Export of Solid Non–Hazardous Waste from Ontario

We are pleased to provide you with 10 copies of our final report on the export of solid non–hazardous waste from Ontario.

We appreciate the cooperation and assistance that was offered the study team by Ministry staff in preparing this report. In addition, we would like to acknowledge the cooperation and assistance provided by the United States Customs Service and Bridge Authorities at various border locations.

We have enjoyed the opportunity to work on this most interesting and challenging project.

Yours very truly,
GARTNER LEE LIMITED

P.J. Manley, P.Eng.
Senior Environmental Engineer

KAJ:mm
Encl.

EXECUTIVE SUMMARY

The movement of solid non–hazardous waste out of Ontario for disposal is a complex phenomenon influenced by a range of interacting economic, regulatory and strategic factors.

In order to assess Ontario's progress toward the Provincial waste diversion targets and to determine the significance of the export activity, the Ontario Ministry of the Environment and Energy commissioned this study to develop an accurate estimate of waste quantities exported in 1992 and to gain a better understanding of the factors influencing waste export.

The study was undertaken in two phases. In Phase 1, a preliminary investigation was made of 14 potential information sources. It was determined that data provided by the U.S. Customs Service, supplemented with a border crossing exercise conducted by the study team would be the primary data sources to estimate the quantity of waste exported in 1992. Secondary information sources including contacts with private waste management industry and waste management officials in Ontario and the U.S. were used to serve as points of comparison for this estimate and to provide information on the origins, destinations, and composition of exported wastes. The results of Phase 1 and analysis of alternatives are appended to this report.

Using the primary estimation method it was determined that approximately 1.3 million tonnes of solid non–hazardous waste were exported from Ontario to disposal facilities in the U.S during 1992. Information provided from secondary sources confirmed this figure as being a reasonable estimate.

For example, based on data provided by waste management officials from key Ontario exporting jurisdictions, it was estimated that total 1992 waste exports were approximately 1.4 million tonnes. The Municipality of Metropolitan Toronto and the Regions of Peel, Halton and Hamilton–Wentworth reported most of the waste export. This was mainly industrial, commercial and institutional waste typically collected by private haulers.

Similarly, data collected from officials and private industry contacts in U.S. jurisdictions showed that approximately 1.0 million tonnes of solid non–hazardous waste were received at U.S. disposal facilities in 1992. It should be noted however, that limited information was available on waste exports to disposal facilities in Michigan and New York and, therefore, this figure likely underestimates total imports of Ontario waste.

Construction and demolition material made up a significant proportion of total waste exports from Ontario. For example, in Ohio, officials estimate that approximately 450,000 tonnes of construction and demolition waste were received in that state alone from Ontario in 1992.

A number of factors have contributed to the export of waste to disposal sites outside of Ontario, including:

- a policy decision by the United States Department of Agriculture in July 1991 no longer requiring incineration of imported Canadian waste;
- significant differences in the total disposal costs, tipping fees and haulage, between disposal facilities in Ontario, particularly the Golden Horseshoe Area, and available U.S. disposal options.
- restrictions on service areas at existing private landfill sites and material bans at municipal sites;
- the absence of federal export control; and
- a relatively unrestrictive U.S. regulatory and policy environment.

Broad conclusions drawn from the study analysis of economic variables suggests that waste exports could be nearly eliminated for wastes eligible for municipal landfilling in the Golden Horseshoe area, if tipping fees at municipal landfill sites were in the range of $80 to $90 per tonne. It is important to note, however, that in practice no single trigger point exists at which the private waste management industry will return waste flows to Ontario's municipal landfills. Several considerations including negotiated tipping fees with U.S. facilities, ownership patterns and specific origin/destination options, will influence individual industry decisions.

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1.0 INTRODUCTION

1.1 BACKGROUND

The movement of solid non–hazardous waste out of Ontario for disposal is a complex phenomenon influenced by a range of economic, regulatory and strategic factors. Beginning with significant increases in tipping fees in the Golden Horseshoe area and changes to U.S. Department of Agriculture regulations no longer requiring incineration of solid non–hazardous waste originating in Canada, the quantities of waste exported into the United States have grown dramatically since mid–1991.

Various efforts to quantify waste exports have been undertaken both in Ontario and in the U.S. Unfortunately, however, no single data source has been available to lend any degree of confidence to these estimates. The only agency which currently collects data on the cross border movement of waste materials is the U.S. Customs Service. There are, however, significant limitations in these data.

The Waste Reduction Office (WRO) of the Ontario Ministry of Environment and Energy (MOEE) is monitoring waste diversion and progress towards the Provincial waste diversion targets of 25% for 1992 and 50% by the year 2000. In order to accurately assess diversion progress, a sound understanding of the role export plays in Ontario's waste management systems is required. In particular, the need for a more accurate estimate of waste quantities exported during 1992 was recognized.

In order to determine the significance of the export activity, there is also a need to understand the factors which influenced waste export and those which may affect future flow patterns.

1.2 STUDY OBJECTIVES

This study was initiated in response to the information needs of the WRO. The purpose of the study assignment was, *to obtain current information on solid non–hazardous waste that is exported for disposal outside Ontario in 1992*. The study objectives can be grouped into two distinct but interrelated areas. The first set of objectives relate to the estimation of 1992 waste export quantities, and information on the origin, destination and characteristics of the material flows. The second set relate to gaining an understanding of the factors which contribute to waste export.

The study objectives related to waste quantities include:

a) estimation of total waste exports from Ontario in 1992;
b) allocation of the exported waste to the IC&I and residential sectors;

c) identification of facilities outside Ontario which are accepting Ontario waste, and where possible determine the quantities received in 1992; and

d) identification of Ontario jurisdictions from which waste export occurs and where possible, estimate export quantities by jurisdiction.

The study objectives related to addressing factors which contribute to waste export include:

a) assessment of tipping fees at Ontario disposal facilities;

b) assessment of tipping fees at disposal facilities outside Ontario, particularly in bordering Canadian provinces and U.S. states;

c) evaluation of the transportation costs of waste haulage; and

d) identification of legislative and policy issues related to Ontario waste export.

1.3 THE PHASED STUDY APPROACH

It was recognized early in the study that a wide range of potential data sources existed. In order to meet the study objectives within the time frame available, it was essential to determine the most efficient approach to investigate and to assess the quality of data available from these sources. The study, therefore, proceeded in two distinct phases:

Phase 1 – preliminary data assessment; and
Phase 2 – implementation of appropriate methodologies and data assessment.

Phase 1 involved a preliminary investigation of 14 potential sources of information as follows:

a) U.S. Customs and Census Bureau data;

b) a border monitoring program;

c) U.S. solid waste management officials;

d) U.S. Congressman Bill Paxon and U.S. Senator John Glen whose offices have been active in investigations of waste imports and the interstate movement of waste;

e) regional and local municipalities in Ontario;

f) WRO data base;

g) MOEE Investigations and Enforcement Branch data base on waste movements within and outside the province obtained from a Vehicle Inspection Program carried out in 1992;

h) Certificates of Approval for private waste transfer and processing facilities in Ontario which often require some form of records on waste type, source and destination;
i) waste management publications;
j) Association of Municipal Recycling Coordinators data base;
k) Ontario Waste Management Association;
l) Ministry of Transportation and Trimac transportation cost data base; and
m) private transfer / processing facility owners in Ontario.

An assessment was made of the information available through these sources, the general degree of confidence associated with each source and the issues involved with pursuing it for the purposes of this assignment. These assessments as well as the recommendations and work program for proceeding to Phase 2 were presented in the Phase 1 report, "Export of Solid Non–Hazardous Waste from Ontario; Data Assessment and Phase 2 Recommendations". This report is included as Appendix A of this document.

The Phase 1 report was used as the basis of discussion and a joint decision with the WRO regarding the specific approach to be used in Phase 2. In summary, the conclusions of Phase 1 included:

a) use the data provided by the U.S. Customs Service in Buffalo, New York together with results of a border monitoring exercise as the *primary* data sources for the 1992 export quantity estimate; and

b) pursue other promising data sources to verify this quantity estimate and to provide other required information.

A brief overview of data sources which were used in Phase 2 are described in the following section. The information obtained from these sources is presented and described in Sections 2 and 3.

1.4 PHASE 2 INFORMATION SOURCES

a) U.S. Customs Manifest Declaration Records

The preliminary investigation confirmed that U.S. Customs is currently the only agency which collects data on the transborder movement of waste on a consistent basis.

In summary, however, our investigations determined that comprehensive data are not readily available through this source. Although export data are generally compiled by U.S. Customs and made available to the Census Bureau of U.S. Department of Commerce for publication, export loads valued below $1,250.00 are not published. Loads containing waste materials destined for disposal are usually assigned a dollar value below $1,250.00 and are, therefore, excluded from published trade data.

The only useful data which were available from U.S. Customs were contained in a report on 1991 waste imports prepared by Operational Analysis Staff of U.S. Customs in the Buffalo, New York District. This report provides an estimate of solid non–hazardous waste imported into the U.S. through border crossings in the Niagara Region area. Similar data was also provided to the study team for the first quarter of 1992. This 1992 data was used as the basis of the study estimate of total 1992 waste exports.

Since the U.S. customs information was limited to the Niagara Region crossing points, a methodology was required to understand the movement of waste through other border crossing points relative to the Niagara crossings. A border monitoring exercise was the best available approach to obtaining an approximate estimate of activity at the other border crossings.

b) Border Monitoring

It was recognized at the end of Phase 1, that a direct survey of waste haulage vehicle drivers, with the assistance of U.S. Customs officials, at all Canadian – U.S. border crossing points in Ontario was the favoured approach to gathering both the required quantity information and more detail on origin, destination and waste type. Significant effort was made to secure the necessary approvals, however, U.S. Customs declined our request to administer such a survey. Issues such as privacy laws and probable delays in processing truck traffic were cited as the reasons for denial. It may also have been the case that the time frame for a decision was relatively short and the necessary cooperation of various Canadian and U.S. agencies had not been well established.

Approval was granted, however, from the relevant Bridge Authorities and Commissions to conduct a visual counting exercise at select border crossing locations. These are described in further detail in Section 2.2. Staff from U.S. and Canadian Customs, and U.S. Immigration also provided support and cooperation throughout the planning and implementation of this exercise.

c) Waste Management Officials in the U.S. and Quebec

It was expected that the bordering U.S. states would be the primary recipients of Ontario waste exports. It was not clear, however, if the differential in tipping fees at disposal facilities in other U.S. states and other factors would be significant enough to cause waste to be transported longer distances. The study team, therefore, contacted waste management officials in a total of 19 states, generally within the northeast and central regions of the U.S.

From a regulatory perspective, our contacts indicated that the monitoring of out–of–state waste is inconsistent across these regions. Of the border states, only Ohio and Pennsylvania currently have a regulated disposal facility reporting system in place. While waste management officials in New York and Michigan have a general knowledge of waste imports into their states, limited data on the amount of waste imported from Ontario is available. Officials in other states provided valuable insights into interstate movements of waste generally, and in some cases (notably Indiana), data on imports of Ontario waste were also provided.

Waste management officials in the Quebec Ministry of Environment were also contacted. These officials were able to provide general comments on the Ontario–Quebec movement of waste materials.

d) Regional Municipalities in Ontario

The WRO presently collects information from municipalities on the disposal of municipal waste within their jurisdiction. This reporting indicates whether a jurisdiction is exporting waste for disposal. Unfortunately this information is generally limited to the waste which is controlled by the municipality and, therefore, excludes most industrial, commercial and institutional (IC&I) waste and construction and demolition (C&D) debris. Furthermore, "waste export" has been interpreted in these reports to mean the export of materials outside the municipal boundaries of the jurisdiction for disposal, and not necessarily out of the province.

The study team contacted waste management officials in key Regional municipalities and specific lower tier municipalities in which there was a reasonable expectation that waste export may be occurring. Information was requested on both the municipal and privately managed waste streams. The data collected from these contacts is presented in Section 2.4.3.

e) Facility Operators/Owners in the U.S. and Ontario

In states where no regulatory disposal facility reporting system was in place, particularly in New York and Michigan, direct contact was made with facility owners to obtain data. Information from Ontario and U.S. officials on the major disposal facilities which may have accepted Ontario waste during 1992 was used as the starting point for these contacts. This information was supplemented and cross referenced with facility information obtained from U.S. Customs and MOEE's Investigations and Enforcement Branch. Very limited response was received from U.S. disposal facility owners. Where data was made available, by agreement with the operators, the data are only reported in aggregated form.

Similarly, a limited number of private transfer station/processing facility owners in Ontario were contacted. Although it was clear from these contacts that business records would contain the export quantity information required for this study, the facility operators considered this information proprietary.

A preliminary review of the service areas, residual management, record keeping and reporting requirements specified in Ontario Certificates of Approval for private transfer/processing facilities also indicated that relevant information would likely be maintained at Ontario facilities. In most cases, however, these data are not readily available and this source was not pursued further.

Staff from the Ontario Waste Management Association (OWMA) were contacted and provided valuable insights into the export phenomenon throughout the course of the project. No data base on waste exports has been compiled by the Association, although we understand that a study now underway by the OWMA could provide new information on export activity.

f) Ministry of Environment and Energy Investigations and Enforcement Branch

The MOEE's Investigation and Enforcement Branch (IEB) has compiled a significant data base on the movement of waste materials in the Province and for export through its ongoing investigative functions. The IEB participated in this study by providing confidential information to the study team on the carriers, origin and destination records and general insights obtained through a vehicle inspection program undertaken in January through June 1992. This information was valuable in confirming waste haulage vehicles observed during the vehicle counting exercise and in identifying U.S. disposal facilities. IEB officials also provided information on the average payloads of haulage vehicles carrying solid non–hazardous waste for export. However, data on specific load weight or contents were not available due to confidentiality.

1.5 REPORT ORGANIZATION

This report is organized as follows:

a) Section 1 (this section) provides a background to the study, describes the study objectives and the two phased approach to complete the assignment and provides an overview of the data sources used in Phase 2 and report layout;

b) Section 2 describes the study approach used to estimate 1992 waste export quantities and presents the information obtained from other estimation sources;

c) Section 3 describes the factors which have influenced waste export and those which may affect future flow patterns; and

d) Section 4 provides the conclusions of the report.

2.0 ESTIMATES OF 1992 WASTE EXPORTS

This section addresses the first set of study objectives dealing with waste quantities exported in 1992. An overview of the estimation approach is provided followed by a description of the border monitoring program and a detailed summary of the methodology and extrapolation procedure used to estimate 1992 waste export quantities. The information available through secondary data sources is also presented. The secondary source information serves as points of comparison for the study estimate and supplies the only indications available on waste composition, origin and destinations.

All tonnage quantities have been converted from imperial to metric tonnes where required and all dollar values are Canadian dollars. Information in the text of this report reflects best available data as of March 1993. Updates where available are provided in Appendix E.

2.1 OVERVIEW OF STUDY ESTIMATION

As described earlier, this assignment was undertaken in two phases. The first phase concluded that the only reasonably comprehensive, accessible record of transborder movements of waste is the information compiled by the U.S. Customs Buffalo District. It was determined that this record would be the primary data source for the 1992 quantity estimation. This information was supplemented with data collected from the border monitoring program and an analysis of municipal landfill records in Ontario to determine seasonal variations of waste disposal.

Our primary estimation method, using the Buffalo customs data and the border monitoring, resulted in an estimate of 1.3 million tonnes of solid, non–hazardous waste exported from Ontario in 1992, in the two harmonized system commodity codes deemed to account for most non–recycled waste shipments. An alternative estimate, based on data from Ontario municipal waste management officials, put 1992 exports at about 1.4 million tonnes. Data collected from key U.S. waste receiving jurisdictions suggested an estimate of over 1.03 million tonnes for 1992.

It is recognized that the study approach is subject to estimation errors from a number of sources. In our view, however, it represents the best available data on waste exports at this time. It also should be noted that it was not possible, given the level of detail in our data sources, to provide an estimate of the waste flows disaggregated by waste type or jurisdiction of origin.

2.2 THE BORDER MONITORING PROGRAM

2.2.1 Program Objectives

The main objective of the vehicle counting exercise was to provide an indication of the number of waste haulage vehicles entering the U.S. at select border crossings in southwestern and eastern Ontario relative to the number at the border crossings in the Niagara Region.

The secondary objectives were to identify the types of vehicles expected to be carrying solid non–hazardous waste and to determine the pattern of traffic throughout the day and over the week.

2.2.2 Description of Border Monitoring Locations

Given the project scope, our border monitoring team was not able to monitor all 14 Canada–U.S. border crossing points in Ontario. Similarly, we did not monitor potential waste exports across the Ontario–Quebec border. In consultation with the WRO, the following decisions were made regarding the selection of an appropriate number of Canadian–U.S. border crossings to monitor:

a) it was assumed that little or no waste was crossing into the U.S. through the four border crossings in northwestern Ontario. This assumption was based on discussions with officials in bordering northwestern Ontario towns, U.S. Customs, and waste management officials in Michigan and Minnesota;

b) for the remaining 10 Ontario–U.S. border crossings, we used information from our Phase 1 data investigations and discussions with Bridge Authorities and U.S. Customs officials to select which crossings to monitor most intensively. It was evident from these sources that most waste exports were through the border crossings in the Niagara Region, Windsor and Sarnia. We, therefore, monitored most intensively at these crossings.

c) of the four crossings in the Niagara Region, the Rainbow and Whirlpool Bridges were not monitored since waste haulage vehicles are prohibited on these bridges. Vehicle counts were only recorded at the Queenston–Lewiston and Peace Bridge crossings;

d) for the three southwestern Ontario crossings, we concentrated our monitoring at the Ambassador Bridge based on information which showed that it accounted for more total commercial and waste haulage vehicle traffic than the Sarnia crossing (Bluewater Bridge) and the Windsor Tunnel; and

e) much less effort was utilized at the three border crossings in eastern Ontario (Ivy Lea Bridge, Prescott and Cornwall), conducting only one day of observations at the Ivy Lea Bridge crossing near Gananoque.

In summary, a total of six border crossings were monitored as follows:

a) the Queenston–Lewiston and Peace Bridge crossings in the Niagara Region;
b) the Ambassador Bridge, Windsor Tunnel and Bluewater Bridge crossings in southwestern Ontario; and
c) the Ivy Lea Bridge crossing in eastern Ontario.

The locations of these border crossings are shown in Figure 1.

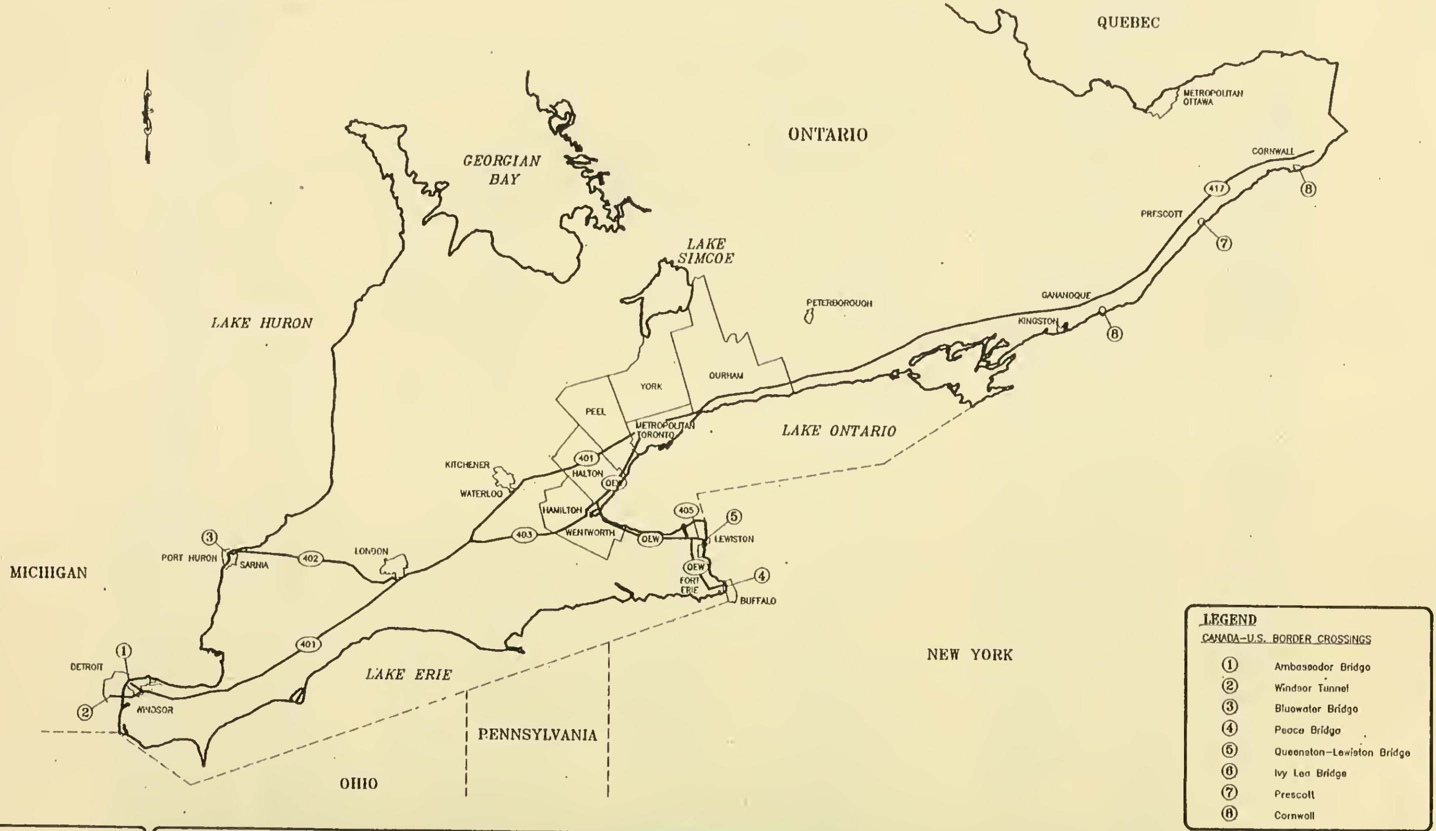
The border monitoring survey was conducted over the period beginning Sunday, February 7 and ending Saturday, February 13, 1993. The monitoring schedule is presented in Table 1.

Table 1: Border Monitoring Schedule

Bridge / Tunnel Crossing	Monitoring Schedule
Niagara Region	
▪ Queenston–Lewiston Bridge	Feb. 7 – Feb. 13 (inclusive)
▪ Peace Bridge	Feb. 8 – Feb. 13 (inclusive)
Southwestern Ontario	
▪ Ambassador Bridge	Feb. 7 – Feb. 13 (inclusive)
▪ Windsor Tunnel	Feb. 9 – Feb. 11 (limited hours)
▪ Bluewater Bridge	Feb. 10 – Feb. 11
Eastern Ontario	
▪ Ivy Lea Bridge	Feb. 11

2.2.3 Vehicle Identification Approach and Observations

The border monitoring exercise was based on the visual identification and counting of vehicles expected to be carrying solid non–hazardous waste for disposal. To ease in visual identification, survey crews were situated at border crossing locations where commercial vehicles were required to stop for declaration purposes or for paying tolls.



LEGEND

CANADA–U.S. BORDER CROSSINGS

① Ambassador Bridge
② Windsor Tunnel
③ Bluewater Bridge
④ Peace Bridge
⑤ Queenston–Lewiston Bridge
⑥ Ivy Lea Bridge
⑦ Prescott
⑧ Cornwall

Gartner Lee

WASTE REDUCTION OFFICE

CANADA–U.S. BORDER CROSSINGS IN SOUTHERN ONTARIO

GLL 92-304 JUNE 1993

Figure 1

Materials were provided to the survey crews to assist in judging whether a vehicle was carrying solid waste for disposal including:

a) a listing of 47 companies (Canadian and American) which may be carrying solid waste. This list was developed from information obtained through discussions with U.S. Customs and Bridge Authorities, a MOEE listing of private companies operating approved transfer/processing facilities in the GTA and Hamilton–Wentworth, discussions with IEB officials, a directory of OWMA member companies who operate transfer stations and provide waste haulage services, and a pilot survey on February 3 at the two crossings in the Niagara Region;

b) a listing of key words or markings on the vehicle cab or trailer which would indicate that a vehicle is carrying solid non–hazardous waste for disposal; and

c) descriptive and pictorial information on typical solid non–hazardous waste haulage truck configurations and types grouped into single tractor trailer, double tractor trailer (single trailer and "pup") and smaller vehicle categories.

Two training sessions were conducted with the survey crew to ensure a high level of consistency in the collected data.

A vehicle classification form was used to record the number and type of vehicles observed during each monitoring period. Appendix B contains an example of this form.

Vehicle observations were grouped into two main categories; *confirmed and possible. Confirmed* vehicles were those judged to be carrying solid non–hazardous waste with a high degree of probability. A vehicle was counted as *confirmed*, if it met one of the following criteria:

a) the vehicle had markings indicating it was carrying solid non–hazardous waste; or

b) the name of the vehicle carrier matched one of the names on the company listing provided AND the vehicle was similar in configuration and size with typical solid non–hazardous waste haulage trucks (the latter condition was imposed to account for those carriers who transport goods other than waste, e.g., Laidlaw).

A vehicle was counted as *possible* if it only matched the configuration and size of a typical solid non–hazardous waste haulage vehicle and if vehicle markings did not clearly identify an alternative cargo.

Over the course of the survey period, a total of 971 observations were recorded of *confirmed* waste haulage vehicles and 608 *possible* observations were noted. These are summarized in tabular format in Appendix C.

2.3 ESTIMATION PROCEDURE TO DETERMINE WASTE EXPORT IN 1992

2.3.1 U.S. Customs Estimate for First Quarter 1992

As discussed in Section 1.4 a), an analysis of customs filings by trucks crossing from Ontario to New York State through the Peace and Queenston–Lewiston bridges in the Niagara Region was conducted by the U.S. Customs District in Buffalo. Data for 1992 was limited to the first Quarter (January–March inclusive). In this period, 6,900 trucks carrying solid waste were observed, based on those vehicles that reported carrying shipments in the two commodity codes that are thought to account for the vast majority of landfilled or incinerated wastes. These codes cover "other waste and scrap of paper", tariff number 47079000 (considered by U.S. Customs to include most residential and IC&I waste) and "other wood waste and scrap", tariff number 4401304090 (considered by U.S. Customs to cover most construction and demolition wastes). Other wastes such as scrap tires are covered under separate entries and are excluded from these two codes.

2.3.2 Methodology for Conversion to an Annual Estimate in Tonnes

To convert the Niagara Region data to an annual estimate for all border crossings for 1992, the following steps were required:

a) estimate the share of total crossings at all Ontario–U.S. border crossings that are covered by the Buffalo data, in order to gross up the observed total to include crossings in southwestern and eastern Ontario. This estimate would enable the study team to gross up the Buffalo data into estimated waste haulage truck traffic at all border crossings.

b) determine the mix of vehicle sizes and cargo weights in the observed traffic. While the Buffalo District of U.S. Customs did record weight data from its records, these were judged to be unreliable based on wide swings in vehicle cargo weights in the reported records for 1991 and the first quarter of 1992, and on discussions with officials in the waste management industry on typical tonnages per vehicle.

c) determine the likely share of total 1992 activity expected to be accounted for by the first quarter. This enables a conversion of 1992 first quarter vehicle counts and tonnages into annual estimates.

The first two of these steps were accomplished using the results of the vehicle counting exercise. In using the vehicle count for these purposes, the following assumptions were made:

- the share of total waste vehicle border crossings at all border points accounted for by observed waste vehicle crossings in the Niagara Region in the monitored week in 1993 is similar to the share that this area accounted for in the first Quarter of 1992. That is, if February 1992 had a greater or lesser degree of overall activity than the first Quarter of 1992, we are assuming that rate of increase or decrease was similar at each border crossing since no data exist for the other border crossings aside from our limited observations, we have no method of assessing the degree to which this assumption could introduce an error in our estimates; and

- to the extent that the survey crew monitoring at the border are unable to be fully certain in identifying vehicles as carrying waste, we are assuming that this tendency is reasonably similar at all border crossings, leaving the shares of crossings largely unaffected.

The third step outlined above was accomplished through observations on the seasonality of disposed wastes at selected Ontario municipal landfill sites and the share of such activity accounted for in a typical first quarter.

2.3.3 Vehicle Count Data and Extrapolations

As stated in Section 2.2.3, based on partial observations at six border crossings, we observed 971 vehicles judged to be carrying solid waste with a high probability (*confirmed* vehicles) and a further 608 vehicles deemed to be *possibly* carrying solid waste. (See Appendix C for details.)

This count was extrapolated to obtain an estimate for the full week (24 hour days) at all border crossing points using the following steps, each of which entails an additional assumption in our methodology:

a) The missing 10:00 p.m. to 5:59 a.m. data we calculated using the observed ratios of activity in this shift to activity in the rest of the day for those days where the early morning observations were made. (An early morning share was calculated for each of the confirmed and possible truck categories.) This assumes that the Monday–Wednesday early morning shares of daily activity are typical for the week as a whole;

b) Missing days at the Ambassador Bridge were filled in using the observed ratio of activity on the Ambassador Bridge relative to the Peace and Queenston–Lewiston Bridges from those days where all three were covered;

c) Waste haulage vehicle traffic through the Windsor Tunnel was assumed to be equal to the traffic at the Ambassador Bridge, based on a comparison of results in a limited monitoring effort at the tunnel relative to the same period at the Bridge. This was contrary to our expectation that the tunnel would show very low activity. Discussions with officials from the Windsor tunnel revealed that although there is a more stringent height restriction in the tunnel, the lower tolls for the tunnel, and its potential advantages in distance and time for some origin–destination pairs, make it a favourable crossing for some haulers. One major firm in particular may be concentrating its efforts in the tunnel in order to take advantage of a volume discount it thereby obtains on the tolls;

d) Missing days on the Bluewater Bridge were filled in using the observed ratio of activity at the Bluewater Bridge relative to the Ambassador Bridge on days where both were covered;

e) Missing days at the Ivy Lea Bridge were allocated based on its share of activity relative to all other bridges monitored in the same period as the monitoring on the Ivy Lea;

f) The two other crossings points in eastern Ontario (Cornwall and Prescott) were allocated activity by multiplying their share of total commercial vehicle traffic relative to the Ivy Lea Bridge (obtained from Bridge Authority officials) by the estimated waste vehicle traffic at the Ivy Lea Bridge; and

g) The traffic from Saturday at 10:00 p.m. to Sunday at 9:59 p.m. was assumed to be equal to that of Friday night to Saturday, with the exception of the evening Sunday period for the Queenston–Lewiston and Ambassador Bridges, where the observed hourly rates of traffic from the previous Sunday were used.

After these extrapolations, we estimate that there were a total of 1,562 *confirmed* waste vehicles and 1,101 *possible* waste vehicles at all crossing points over the full week. We assumed that half of the *possible* vehicles were in fact carrying solid waste for disposal resulting in an adjusted total of over 2,100 vehicles. The results of the extrapolations are provided in Appendix C. All of our remaining calculations use these adjusted or weighted totals. Of the adjusted total of 2,100 vehicles, just over half were at the two crossings monitored in the Niagara Region. The Niagara Region crossings also accounted for a larger share of single–trailer vehicles and a smaller share of double–trailer and small trucks as shown in Table 2.

Table 2: Truck Count as Share of Niagara Region Count Based on Adjusted Border Monitoring Results

Niagara Region	**Number**	**Share of Niagara Region**
Single Trailer	995	–
Double Trailer	21	–
Small	66	–
Total	**1,082**	
All Other Crossings	**Number**	**Share of Niagara Region**
Single Trailer	771	77.5%
Double Trailer	151	732.4%
Small	108	163.3%
Total	**1,030**	**95.2%**

2.3.4 Estimation of First Quarter 1992 Tonnages

The U.S. Customs Buffalo District estimate of 6,900 waste trucks in the first quarter was allocated to truck sizes based on the proportions of single–trailer, double–trailer and small trucks observed in our week at Niagara Region crossings (counting only one–half of the *possible* trucks and all of the *confirmed* trucks)[1]. This results in an estimated 6,345 single trailer trucks, 132 double–trailer trucks and 423 small trucks.

The number of trucks of each size at all other crossings was assumed to be related to these Niagara Region totals based on our observed/estimated ratio in the monitored week. This results in an estimated 6,571 trucks at all other crossings, which are allocated by size in proportion to their share in our observation week at these crossings, with 4,914 assumed to be single–trailer, 966 double–trailer and 691 small trucks.

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[1] A sensitivity analysis showed that our final tonnage estimate would not change significantly using alternative weights on the "possible" vehicles.

First quarter tonnages were then estimated by assuming that single trucks carried an average payload of 20 tonnes, double trailers carried 25 tonnes and small trucks 9 tonnes. These tonnages are based on discussions with waste management industry officials and weight limitations on U.S. roads. Using these weights, we estimate total first quarter 1992 Ontario exports at just over 260,000 tonnes, as shown in Table 3. Note that this estimate could include some wastes destined for recycling facilities. It would also exclude wastes in commodity categories not monitored by U.S. Customs in Buffalo. This particular methodology does not enable us to estimate these two potential sources of error.

Table 3: Estimated Waste Export Vehicles and Tonnages; 1992 First Quarter

	TRUCKS			**TONNES**		
	Niagara Region Crossings	**Other Crossings**	**Total**	**Niagara Region Crossings**	**Other Crossings**	**Total**
Single Trailer	6,345	4,914	11,259	126,902	98,286	225,188
Double Trailer	132	966	1,097	3,296	24,138	27,434
Small	423	691	1,114	3,808	6,220	10,027
TOTAL	**6,900**	**6,571**	**13,471**	**134,005**	**128,644**	**262,649**

2.3.5 Estimation of Annual Tonnages

To arrive at an annual estimate for 1992, we assessed the likely share of total annual waste export activity contributed by the first quarter of that year.

Monthly data on wastes disposed of at Ontario municipal landfill sites were obtained from Metro Toronto (Keele Valley and Brock West Landfills) and the Regions of Hamilton–Wentworth (Glanbrook Landfill), Waterloo (Waterloo and Cambridge Landfills) and Ottawa–Carleton (Trail Road Landfill). Data received from Ottawa–Carlton was of insufficient length to be of use, and was, therefore, excluded. For the other regions, we excluded data for 1992, since this period was known to include significant waste export activity, and we wished to obtain an understanding of the seasonality of the exported waste, rather than the waste that remained at Ontario landfill sites.

Within the data reviewed (1989–91), the first quarter typically accounted for 21–22% of total annual waste disposed tonnages, with the exception of Metro Toronto data for 1990. We believe that the higher share observed in the first quarter of that year in Metro Toronto is in part attributable to the economic slowdown in 1990, which drove down industrial and commercial activity. The 1991 shares for the first quarter in Hamilton and Waterloo may be affected by the emergence of waste export activity in the last quarter of that year.

We believe that the lowest of the estimates, or 21%, is an appropriate share to assume for the first quarter for waste exports in 1992, for the following reasons. First, this estimate was for IC&I and C&D waste, which likely accounts for a large share of total waste export activity. Second, we would expect that since the economy recorded positive GDP growth over the year, the first quarter share was likely to be lower than the observed in 1991 data, when the economy was shrinking. Note that our estimate assumes that there was no significant shift in export activity through the second to fourth quarters of the year other than changes attributable to the seasonality of total waste generation.

Using a 21% first quarter share estimate and our estimated first quarter 1992 exports of just over 260,000 tonnes as shown in Table 3, the U.S. Customs data – Vehicle Count method arrives at an estimated 1.3 million tonnes (i.e., 260,000 x 5) of solid non–hazardous waste exports from Ontario in 1992 in the two commodity categories deemed by customs officials to account for most non–recycled wastes. This estimate may include some wastes destined for recycling, but also excludes other waste categories (sorted, uniform materials such as tires, glass, etc.) which may have been sent to the U.S. for disposal. No data are available from U.S. Customs on such waste shipments.

It is interesting to note that the vehicle count appears to suggest, albeit subject to considerable potential error, that first quarter 1993 export activity may be significantly greater than in the first quarter of 1992. Our estimate for total vehicle traffic in the week, at about 2,100 trucks, would yield a first quarter estimate (at that weekly pace) of over 500,000 tonnes, or an annual pace (seasonally–adjusted) of about 2.5 million tonnes. This may reflect both the fact that export activity was still emerging in early 1992 and, to a lesser extent, the growth in economic activity over 1992 to early 1993.

2.4 OTHER ESTIMATION SOURCES

2.4.1 U.S. Waste Management Officials and U.S. Facility Operators

Contacts with the U.S. Environmental Protection Agency and waste management officials at the State and County levels provided data on the legislative environment governing out–of–state waste imports, reporting requirements and where possible estimates of quantities received during 1992. Officials were also asked to indicate the average tipping fees at facilities in their jurisdiction and to indicate any factors which may influence future movement patterns. The list of contacts is provided in Appendix D.

As summarized in Table 4, of the 19 states contacted, 10 indicated that a formal reporting system is in place to track interstate movement of waste. Of these, three states, Ohio, Pennsylvania and Indiana confirmed that Ontario waste was accepted at disposal facilities in their jurisdictions during 1992. Maine reported some receipts of special wastes from Canada, such as used tires. Some of this may have been from Ontario. Three other states, Iowa, Kentucky and Vermont, control the interstate movement of waste through permitted service areas. None of these have permitted a disposal facility to accept Ontario waste. The final six states contacted reported limited or no regulatory control with respect to out–of–state or out–of–country waste. Of these, New York and Michigan are known to be key states accepting waste from Ontario. Without a comprehensive reporting system in these states, officials were unable to provide import quantity estimates, on a state wide level.

The following provides a summary of the waste quantity data compiled through state official contacts.

Pennsylvania

The Commonwealth of Pennsylvania has a comprehensive municipal waste planning and recycling law, known as Act 101 of 1988, the Municipal Waste Planning, Recycling, and Waste Reduction Act. Under this Act, owners of all municipal waste landfills and resource recovery plants in Pennsylvania must report the origin and tonnage received on a quarterly basis. These reports identify waste originating in Canada. Officials indicated that this Canadian waste is believed to be from Ontario. The exact origin, however, cannot be confirmed.

A total of 10 facilities reported receiving Canadian waste during 1992. As noted in Table 5, the largest recipient of imports from Canada was the Greentree Landfill, which accepted 110,247 tonnes of mixed waste. The Imperial Landfill and Lakeview Landfills were the next largest recipients receiving 41,520 tonnes and 72,205 tonnes, respectively. In total, Pennsylvania Landfills accepted 267,868 tonnes of Canadian wastes during 1992.

By comparison, the annual amount received at Pennsylvania landfills during 1991 was 43,021 tonnes, with all but 45 tonnes received in the 4th quarter of the year.

The facility reporting indicates that of the total amounts received, the Lakeview, M.C. Arnoni and Imperial Landfills received 33,457 tonnes of construction and demolition debris. All of this C&D material was received in the third and fourth quarters of 1992 and represented 27% of total imports during those months.

The records further show that 44.5 tonnes of asbestos material was received at the Valley Landfill in the first quarter of the year. This quantity has been included in "mixed" for the purposes of Table 5.

Table 4: Summary of U.S. State Out–of–State Waste Regulatory Requirements

A. Reporting Requirements In Place

State	Out–of–State Waste Regulatory Requirements	Ontario Waste Accepted in 1992 (based on waste management officials assessment)
Illinois	▪ as of January 1992 origin and quantity reporting	▪ none expected; 1992 report not available yet
Indiana	▪ origin and quantity data reporting ▪ surcharge on out–of–state waste	▪ yes; small quantities
Maine	▪ surcharge on out–of–state waste	▪ possibly special waste such as used tires
New Hampshire	▪ surcharge on out–of–State waste ▪ facility reports must be filed ▪ facility must submit a "public benefit" statement	▪ no
New Jersey	▪ county reporting	▪ no, one third of counties must export waste
Ohio	▪ comprehensive reporting, out–of–county and state surcharges ▪ C&D sites regulated by local Boards of Health, no reporting requirements	▪ yes; records of mixed waste available, no reporting of C&D waste
Pennsylvania	▪ reporting requirements, including C&D wastes	▪ yes; records available
Tennessee	▪ haulers report waste origin	▪ none expected, 1992 reports not yet available
West Virginia	▪ monthly reporting required	▪ none expected, 1992 data not yet confirmed
Wisconsin	▪ annual reporting	▪ none expected, 1992 report not yet available

B. Permitted Service Areas

State	Out–of–State Waste Regulatory Requirements	Ontario Waste Accepted in 1992 (based on waste management officials assessment)
Iowa	▪ no facility permitted to accept Ontario waste	▪ no
Kentucky	▪ one facility permitted to accept long haul waste	▪ not expected, 1992 report not yet available; does accept New York waste
Vermont	▪ no facility includes Ontario in the service area	▪ no

C. Limited Regulatory Control

State	Out–of–State Waste Regulatory Requirements	Ontario Waste Accepted in 1992 (based on waste management officials assessment)
Massachusetts	▪ no restrictions/reporting	▪ unknown
Michigan	▪ no restrictions/reporting	▪ yes; quantities unknown
Minnesota	▪ no restrictions/reporting	▪ none expected
Missouri	▪ no restrictions/reporting	▪ none expected except possibly some ash
New York	▪ some out–of–State restrictions on particular facilities ▪ generally no restrictions or reporting requirements	▪ yes; quantities unknown state–wide
Virginia	▪ no restrictions/reporting	▪ unknown

Information Available as of February 1993.

Table 5: Pennsylvania Disposal Facilities: 1992 Imports of Solid Municipal and Industrial Waste from Canada

	TONNES		
	C&D	Mixed	Total
CBF		846	846
County Environmental		9,189	9,189
BFI: Greentree		110,247	110,247
BFI: Imperial	73	41,447	41,520
Kelly Run		1,974	1,974
Lakeview	25,375	46,830	72,205
M.C. Arnoni	8,009	8,418	16,427
Modern		11,293	11,293
Valley		1,815	1,815
York Wte (incinerator)		2,352	2,352
Total	**33,457**	**234,411**	**267,868**

Pennsylvania Act 101 also required the re-permitting of all municipal waste landfills to meet the requirements of municipal waste regulations effective April 1988. This has been completed. Pennsylvania State officials advise that the new U.S. EPA environmental standards for landfill design and operation as required by the Resource Conservation and Recovery Act (RCRA) Subtitle D regulations, effective October 1993, have been met in the State and, therefore, the regulations are unlikely to have an impact on the flow of waste material to Pennsylvania. In January 1992, the three major landfills accepting Ontario waste reported a combined total estimated remaining capacity of over 15.5 million tonnes.

Ohio

In Ohio, solid and infectious waste disposal facility operators must maintain daily logs and report monthly data to the Ohio Environmental Protection Agency.

In 1991, Ohio received 28,297 tonnes of waste from Ontario. Of this 18,864 tonnes of municipal waste were received at the BFI Carbon-Limestone Landfill in Mahoning County, Ohio (near Youngstown) and 9,432 tonnes of industrial waste were received at the American Landfill in Stark County, Ohio (near Canton).

As indicated in Table 6, preliminary estimates and reports from facilities indicate that the amount of Ontario mixed waste imported to Ohio tripled in 1992 to approximately 90,500 tonnes. The BFI Carbon-Limestone Landfill reports receipts of 29,602 tonnes of municipal waste from Ontario. The American Landfill reports receipts of 54,926 tonnes of industrial waste. The Laidlaw Williams County Landfill in northwestern Ohio began receiving five to six trailer loads a day of Canadian waste from a Laidlaw materials recovery facility in Hamilton in late 1992 amounting to approximately 3,000 tonnes for the year. The Inland–Solon Landfill in Cuyahoga County (near Cleveland) received between 2,700 – 3,600 tonnes of Canadian waste in 1992.

Table 6: Ohio Landfills: 1992 Estimated Imports of Ontario C&D and Mixed Solid Waste

Landfill Facility	Tonnes	
	C&D	Mixed
▪ Northeastern Ohio C&D Landfills	450,000	
▪ BFI Carbon Limestone		29,602
▪ American		54,926
▪ Laidlaw Williams County		3,000
▪ Inland–Solon		3,000
Estimated Total	**450,000**	**90,528**

Construction and demolition debris landfills in Ohio are not yet required to submit reports to the Ohio EPA. These landfills are regulated by local Departments of Health and generally have far lower standards to comply with compared to the municipal class landfills. Through contacts with the waste management industry, officials in the Northeast District Ohio EPA office have estimated that facilities in northeastern Ohio received about 450,000 tonnes of C&D debris from Ontario in 1992. This quantity is considered to be a "ball park" estimate and without official reporting or disclosure from facilities there is no way to confirm this number.

Indiana

Owners and operators of solid waste processing facilities and disposal facilities in Indiana must submit quarterly reports to the Indiana Department of Environmental Management. Although record keeping at these facilities varies, State officials advise that the data has improved since the initiation of the requirement in January 1991.

In its first year of reporting, two landfills reported receipts of waste originating in Canada. One facility received Canadian waste in 1992. All of this waste is expected to have come from Ontario.

The Spring Valley Landfill in Wabush County received 403 tonnes of municipal solid waste during the fourth quarter of 1991. Spring Valley is now closed and accepted no Canadian waste in 1992.

The United Refuse Landfill in Allen County received a total of 13,166 tonnes of construction and demolition debris during the second, third and fourth quarters of 1991 and 3,100 tonnes during the first quarter of 1992. This facility was temporarily shut down on April 1, 1992. The agreement to open the facility two weeks later included a condition that no out–of–state waste would be accepted.

New York and Michigan

Due to the lack of state wide reporting of out–of–state waste in the states of Michigan and New York, information regarding possible importing facilities in these states was obtained through discussions with municipal and private waste management officials in Ontario, the IEB and U.S. Customs. These sources enabled the compilation of a partial list of facilities in these two states which likely received Ontario waste in 1992 as shown in Table 7.

Table 7: Partial List of Disposal Facilities in New York and Michigan Expected To Have Received Ontario Waste in 1992

New York	Michigan
▪ Occidental Incinerator: Niagara Falls ▪ Seneca Meadows Landfill: Waterloo ▪ Chautaugua County Landfill: Chautaugua ▪ Cecos Landfill: Niagara Falls ▪ Modern Landfill: Lewiston ▪ Schultz Landfill ▪ Auburn Landfill: Auburn	▪ Woodland Meadows Landfill: Detroit ▪ Grand River Disposal Landfill: Detroit ▪ City Disposal Landfill: Detroit ▪ Pinetree Acres City Management Corp ▪ S&S Environmental Inc. ▪ Riverview Landfill

Operators of these facilities were contacted by the study team and requested to participate in data collection for this study. Although the response rate to our request was low, facility operators which did respond indicated total 1992 receipts of Ontario waste amounting to approximately 220,000 tonnes. Given the low response rate, it is recognized that this estimate may significantly underestimate waste receipts in Michigan and New York.

Although individual quantity amounts cannot be revealed (as agreed with facility operators), some background information on some of the facilities is available, as described below.

Officials from the *Occidental Chemical Incinerator* indicated that due to the technical requirements of this facility, separated C&D material is not accepted. Ontario waste was accepted in 1992, however, the facility experienced a decrease in Ontario waste receipts from 1991 to 1992, in part due to a reduction in residential waste received from Halton Region and in part due to economic factors. Furthermore, the operator indicated that Canadian contracts are not being renewed in 1993. The insecurity of supply was given as the main reason for this decision.

There was a general consensus among the contacted facility operators in New York that waste originating in Ontario has tended to move through New York for final disposal in other states during the last 6 to 8 months. This is likely due to the very competitive nature of the industry and lower tipping fees being offered in other states such as Pennsylvania and Ohio.

In addition to the economic factors, New York facilities are facing strong public concern over acceptance of out–of–state waste. The Auburn Landfill for example accepted Ontario waste in 1991 and in the first quarter of 1992, primarily in an effort to quickly fill a particular cell of the facility. Under a new operating agreement, however, no further "long haul waste" (origin in excess of 60 miles) will be accepted.

Contacts in Michigan provided little information to the study team. As discussed more fully in Section 3.1.2, out–of–state waste disposal is a very controversial issue in Michigan and facility owners are reluctant to release information of this nature.

It is important to note that the data provided by facility operators in New York and Michigan, amounting to an estimated 220,000 tonnes, is not expected to approximate total imports to those states. In Wayne County, Michigan, for example, waste management officials indicated that very large quantities were likely imported to that County during 1992. Industry projections prior to 1992 suggested that as much as 700,000 tonnes of Ontario waste imports were planned for the year. However, the county has no way to confirm how much of these projections actually materialized through the year.

A summary of import quantity data provided through U.S. State and facility contacts is provided in Table 8.

Table 8: Summary of Waste Import Estimates Provided through State Officials and Private Facility Contacts

State and Waste Type		1992 Estimate (tonnes)
Pennsylvania	(all sites)	267,868
Ohio	(mixed waste sites)	90,500
	(C&D sites)	450,000
Indiana	(C&D site)	3,100
New York and Michigan[1]	(mixed waste sites)	220,000
Total		**1,031,000[2]**

Notes:
1 Total of estimates received from four facilities only.
2 Rounded from 1,031,468 due to lack of accuracy in estimated figures.

2.4.2 Quebec Contacts

Service area restrictions on Quebec disposal facilities do not permit the importation of out–of–province solid waste for disposal. Waste management officials in the Quebec Ministry of the Environment indicated that although no Ontario waste has been recorded in the required facility reporting system, there are indications that some Ontario C&D material was brought into the Province illegally during 1992. This is being investigated by Quebec authorities. No estimate of imported quantities was available.

2.4.3 Ontario Regional Municipalities

Given the project scope, it was not possible to do a survey of all municipalities in Ontario. Contacts were made with waste management officials from a selected number of Ontario jurisdictions where there was a reasonable expectation that waste export may be occurring in significant quantities. The factors considered by the study team in this selection included:

a) tipping fees at municipal disposal sites and the pattern of change over the 1989–92 time period;
b) material bans at municipal landfills;
c) proximity to export alternatives within economic hauling distance; and
d) the availability of local public or private disposal facilities.

Based on this analysis, officials from Metro Toronto, the Regions of Peel, Halton, Hamilton–Wentworth and Waterloo, the County of Essex and the Cities of Niagara Falls and Sault Ste. Marie were contacted to provide estimates of waste exports from their jurisdictions. These estimates are summarized in Table 9. The following sections briefly reviews how these estimates were derived.

Table 9: 1992 Waste Exports Estimated by Ontario Waste Management Officials by Jurisdiction

Municipality	(tonnes)
Metro Toronto	900,000
Halton Region	112,000
Waterloo Region	15,000
Peel Region	250,000
Hamilton/Wentworth	100,000
Essex County	20,000
City of Sault Ste. Marie	–
City of Niagara Falls	–
Total:	**1.397 Million**

In Metropolitan Toronto, the Metropolitan Works Department estimated 1992 waste exports from the Region through an analysis of year over year reductions in waste disposed of at Metro's two landfills, Keele Valley and Brock West. From 1990 to 1991, total landfill receipts decreased by about 1,009,590 tonnes. Officials determined that, after accounting for the impact of other major factors such as the economic slowdown and increased 3R measures, export accounted for 532,590 tonnes of the decrease. Similarly, the actual decline in receipts from 1991 to 1992 was 702,507 tonnes. Officials explained 355,000 tonnes of the decline through other factors and attribute 347,507 tonnes to additional exports. The total quantity of waste exported from Metro Toronto in 1992 is therefore estimated at 880,097 tonnes (the sum of 532,590 tonnes and 347,507 tonnes). Metro officials have discussed their estimates with private waste management companies and have concluded that a rounded estimate of 900,000 tonnes is reasonable.

Officials in Peel and Waterloo Regions undertook a similar analysis. As in Metro Toronto, no data base is available which tracks the amount of IC&I waste exports from these jurisdictions. The Peel and Waterloo Regions estimates of 250,000 tonnes and 10,000 to 20,000 tonnes, respectively, are based on waste management official's analysis of landfill records at Regional facilities and discussions with private waste management companies. (For the purposes of Table 9, GLL approximated the 15,000 tonne figure from the Waterloo estimate.)

Officials from the Essex–Windsor Waste Management Committee estimate that 20,000 tonnes of IC&I waste which otherwise would have been landfilled at the County owned facilities was exported to the United States in 1992.

Gartner Lee examined the 1990, 1991 and 1992 records for Hamilton–Wentworth disposal facilities to arrive at an approximate out–of–province export estimate of up to 100,000 tonnes of IC&I waste. The presence of significant private processing and disposal capacity is an important factor to consider in this region. Waste receipts lost at the Regional facilities may also be going to private landfill sites within and outside the region depending on economic variables.

Halton Region is the only jurisdiction in Ontario which reported the out–of–province export of municipal solid waste from the residential sector in 1992. During the first three months of the year, the Region disposed of 12,000 tonnes of waste at the Occidental Chemical Incinerator in Niagara Falls, New York. In addition to the waste managed by the Region, private haulers also exported IC&I waste from the region. Regional officials estimate that approximately 100,000 tonnes of waste from this sector left the region in 1992, all of which was expected to have gone to the U.S. for disposal. This estimate is based on the decline in waste handled at Regional transfer facilities.

Officials in Sault Ste. Marie indicated that due to low tipping fees at the area landfill, no waste export was expected to have occurred during 1992.

Waste management officials in the City of Niagara Falls were also contacted. City officials advised that passenger tires collected separately at the municipal transfer facility are exported, under contract, to a landfill site in New York state. No data or estimates on other exported wastes were available.

2.5 SUMMARY OF FINDINGS

The study findings on 1992 solid non–hazardous waste exports are summarized in Table 10:

Table 10: Summary of Findings

	Information Source	Estimate of 1992 Waste Export Quantities
a)	Study Estimate	1.3 million
b)	Officials from Selected Ontario Municipalities	1.397 million
c)	U.S. State Officials and Disposal Facility Operators	1.03 million[1]

Notes: 1. Based on limited data available on waste exports to disposal facilities in New York and Michigan.

3.0 FACTORS INFLUENCING WASTE EXPORT

This section of the report addresses the second set of study objectives related to the factors which contribute to waste export. In particular, recent regulatory developments in Ontario, Quebec and the United States, 1992 tipping fee structures in these jurisdictions and haulage costs facing the industry are discussed. This section also provides an overview of some trends in the waste management field which may influence future export patterns.

3.1 LEGISLATIVE AND POLICY FRAMEWORK

The regulatory requirements for waste handling, transport and disposal of wastes in Ontario and in potential export destinations provide the basic legislative framework in which the waste management industry must operate. In addition, non–statutory requirements defined through the policies of relevant agencies also have a significant impact on the operations of the industry which will influence the private waste management industry's export decisions.

3.1.1 The Canadian and Ontario Context

At present, there are no bilateral or multilateral agreements with other nations which effectively monitor or manage the movement of solid non–hazardous waste into or out of Canada. Furthermore, until recently[2], no regulatory requirements or general policy positions have existed in Ontario with respect to out–of–province export of solid non–hazardous waste. Provincial requirements for disposal facilities and in particular a number of municipal level policy decisions, however, have had a direct impact on the emergence of waste export as a significant practice in Ontario.

Export of solid non–hazardous waste out of the province can historically be traced to waste management and other policies developed by regional municipalities in the Golden Horseshoe area of the Province particularly the Municipality of Metropolitan Toronto.

In a Metropolitan Toronto Works Committee Report of December 1988, the emerging concern over depleting landfill disposal capacity for the Region was discussed. At that time, it was projected that Metro's two landfills would reach capacity by late 1992 if no action was taken to maximize waste diversion. In response to these projections, Metro introduced three key diversion initiatives of direct relevance to the private waste management industry. These included:

a) significant increases in tipping fees at Metro landfills and transfer stations;
b) bans of specific materials at these disposal sites to maximize diversion of marketable recyclable materials; and
c) possible restrictions on the receipt of private sector wastes at Metro disposal facilities.

As discussed later in Section 3.2, Metro did in fact aggressively raise tipping fees from 1987 through to 1991. In addition, the unpredictability of these increases created uncertainty for business planning in the private waste management industry.

Material bans at Metro facilities began in January 1989 with development of a policy to prohibit loads containing recyclable corrugated cardboard. Corrugated cardboard bans were also in place at other municipal landfills in the GTA at that time. The Region of Halton for example prohibited the disposal of this material at its facilities in September 1988. By 1992, Metro had over 10 recyclable material types banned from its disposal facilities. These included all large metal appliances such as fridges and stoves ("white goods"); corrugated cardboard; tires; drywall; wood; scrap metal; clean fill, concrete and rubble; petroleum contaminated fill; fine paper; and useable off–specification and surplus goods such as packaged food waste, automotive parts and furniture.

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[2] In April 1992, The Ontario Minister of Environment, as part of an announcement that the search for long–term waste disposal sites for the Greater Toronto Area (GTA) would not be outside the GTA, indicated that waste must be managed as close to the source of generation as possible.

The third initiative of possibly restricting receipts of private sector wastes was proposed as part of an emergency plan in the event that Metro could not secure additional disposal capacity by the time Metro landfills had reached a five year capacity for anticipated municipal requirements. Although this restriction was never officially imposed, the proposal created uncertainty and instability in the private waste management industry.

During this same period, Peel Region was experiencing a similar disposal capacity crisis and was considering various contingency measures. One of these was a proposal to freeze development activity within the Region until adequate waste management disposal capacity was in place. As in Metro Toronto, this extreme approach was never implemented, however, it did signal the need for significant change in the Region's waste management system and fueled uncertainty in the industry.

As the private waste management industry in turn responded to these new policy directions, a variety of options were available for consideration including:

a) increased recovery and recycling of materials;
b) movement of waste to other areas of the province where private or municipal disposal capacity existed;
c) establishment of new disposal capacity through new site development; and
d) export of materials out–of–province.

An examination of the private recycling industry is outside the scope of this study, however, it is clear that the viability of increased recovery and recycling of materials is dependent on the economics of material separation, management and marketability, compared to the costs of more traditional disposal options. Furthermore, 3R activity cannot eliminate the need for final disposal of some waste materials and process residuals.

The impact of Provincial regulations and policies are important factors in the viability of the second and third options noted. Defined service areas for Ontario disposal facilities essentially eliminates the free movement of waste materials within the Province. In some cases, the MOEE has granted approval for the extension of service areas at some sites to accommodate short–term needs, however, no service area applications regarding the addition of GTA waste have been accepted by the Province. Similarly, there have been no new private landfill sites approved in the Province since these were subject to the requirements of the Environmental Assessment Act process, starting in March 1987. This option remains a long term, expensive and risky alternative given the current approvals process.

The potential for meeting disposal requirements through out–of–province export depended upon the economics of this option and the restrictions if any imposed in the importing jurisdictions. The economic variables involved are discussed in Sections 3.2 and 3.3. The following discussion addresses the legislative and policy issues in the U.S.

3.1.2 The U.S. Context

The two most significant legislative/policy factors which influenced the export of Ontario solid non-hazardous waste to the United States in 1992 were the United States Department of Agriculture (USDA) policy with respect to incineration of imported Canadian waste, and the controversies in various U.S. states regarding the interstate movement of wastes for disposal.

USDA Waste Incineration Policy

USDA, Animal and Plant Health Inspection Service (APHIS) regulations exist for controlling the movement of *international garbage*, that is, garbage which originates outside the United States and Canada (SCFR Part 94.5 and 7 CFR 300.400). These regulations state that any international garbage received in the U.S. must be incinerated. For example, the international garbage from Toronto Pearson International Airport (which has been shipped to New York) must be incinerated.

An APHIS policy regarding Canadian *domestic garbage* evolved from action taken in 1983, when APHIS staff reviewed a request by a Canadian company to transport Canadian domestic garbage to New York for incineration. APHIS' permit unit exercised "discretionary judgement" by issuing a permit even though the regulations did not require it. After 1983, the practice of issuing permits which contained the provision that the garbage be incinerated evolved into policy.

In 1991, however, American companies interested in taking Canadian waste to U.S. landfills challenged this policy. The USDA recognized that specific regulations requiring incineration of domestic garbage did not exist and that such regulations were not justifiable on biological grounds. As a result, the policy was officially rescinded in July 1991. Since that time, no permit has been required and export of these wastes into the U.S. have been unrestricted by the USDA.

The opening up of the Ontario/U.S. border provided the necessary regulatory environment to allow for the significant export of Ontario waste materials. It should be noted that USDA regulations do not govern inert construction and demolition debris and the incineration policy had never applied to separated C&D loads.

Interstate Movement of Waste

Controversy regarding interstate movement of wastes has been ongoing in a number of midwestern states since the mid 1980s. In recent years, the issue has grown to a national one as states with relatively low disposal facility tipping fees are attracting increasing amounts of waste from areas with higher fees and depleting disposal capacity.

Several states including Ohio, Michigan and Alabama have enacted laws to restrict or place fees on out–of–state waste shipments. In a significant June 1992 decision, however, the United States Supreme Court overturned portions of the Michigan and Alabama laws as unconstitutional violations of the commerce clause. This decision effectively confirmed that States do not have the authority to restrict interstate transport and disposal of waste.

At the federal level, while over 20 bills were brought to the U.S. Congress over the last congressional session in attempts to provide the necessary authority for state control; none of these were passed into law.

In the absence of strong general restrictions, some states have imposed control through facility service areas and/or special agreements with facility owners or amongst jurisdictions. In some states, receipts of out–of–state wastes are monitored through a facility reporting system.

In summary, while interstate movement of waste and receipts of Canadian wastes remained very controversial in the United States, no significant restrictions existed during 1992.

3.2 ONTARIO AND U.S. DISPOSAL FACILITY TIPPING FEES

One of the major economic variables influencing waste export is the differential between Ontario tipping fees and those at potential importing facilities. This section provides an overview of disposal facility tipping fees in 1992. It should be noted that the figures represented here, particularly in the case of U.S. facilities, reflect the reported gate fees and as such provide a general indication of fees at the facility. Individual contracted fees can vary considerably reflecting volumes, materials mix and other factors.

Ontario Facilities

As discussed above, recent aggressive tipping fee increases are largely a Golden Horseshoe area phenomenon. The Metropolitan Toronto owned Brock West Landfill in Durham Region and the Keele Valley Landfill in York Region serve the private sector and municipal needs of Metropolitan Toronto, York and Durham Regions. In 1992, the tipping fee charged for private sector waste receipts was $152 per tonne. Member municipalities are charged on an assessment basis. The fees for privately collected waste at regional facilities in Peel and Hamilton–Wentworth were $150 per tonne and $180 per tonne, respectively, in 1992. In Halton, a new Regional facility opened in November 1992 with a $150 per tonne fee; prior to that, the Regional transfer facility fees were set at rates comparable in the Golden Horseshoe area.

The similarity in rates across the Golden Horseshoe area reflect an effort to reduce interjurisdictional movement of waste. Furthermore, these rates reflect policies to discourage waste generation and to encourage companies to seek recycling alternatives to landfill.

Tipping fees in this area have risen dramatically since 1987. The landfill fees in Metro Toronto, for example, have increased from $18 per tonne in 1987 to $50, $83, $97 and $150 per tonne in the four subsequent years. The 1992 increase to $152 per tonne was set to only reflect general inflationary increases.[3]

Outside the Golden Horseshoe area, 1992 tipping fees for private sector waste were generally lower in 1992. As listed in Table 11, fees in Ottawa–Carleton, Essex County and Waterloo Region facilities ranged from $45 to $77 per tonne. The tipping fee for private waste at the City of Peterborough landfill was $150 per tonne.

Table 11: 1992 Landfill Tipping Fees for Private Sector Waste Receipts at Ontario Municipal Landfill Sites

Golden Horseshoe Area	$/tonne
Durham Region (Brock West)	152
Hamilton–Wentworth	180
Region of Peel (Britannia)	150
York Region (Keele Valley)	152
Other Selected Jurisdictions	
Essex County	45–77[1]
Region of Ottawa–Carleton	51
Waterloo Region	65
City of Peterborough	150

Reference: Association of Municipal Recycling Coordinators Data Base. May 1992

1. Range represents the fees at three landfills in the county

U.S. Facilities

Average tipping fees at disposal facilities in selected U.S. states are provided in Table 12. These rates reflected fees as reported to and compiled by an independent data collection service. The state average is a weighted average calculation based on facility volume and MSW gate fees for commercial haulers. As previously stated, individual facility contracted fees may vary considerably from these averages depending on a number of factors.

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[3] Appendix E provides an update of Golden Horseshoe area tipping fees as of July 1993.

Table 12: Statewide Weighted Average of Tipping Fees at Solid Waste Disposal Facilities in Selected U.S. States

State	$/tonne*
Indiana	27.25
Michigan	40.61
New York	85.89
Ohio	36.84
Pennsylvania	73.62

Reference: Solid Waste Price Index, November 1992 prepared by Solid Waste Digest
* $1.268 Cdn = 1.00 U.S., November 1992

One factor which may have had an influence on tipping fees are the new U.S. EPA criteria for landfill design and operation as required by the RCRA.

These regulations, which take effect October 1993, are expected to result in the closure of certain sites which will not be able to meet the new criteria. Based on our discussions with municipal and private waste management officials, it is possible that some of these sites may have significantly reduced fees in 1992 to attract additional waste receipts from Ontario in advance of stricter regulatory requirements.

3.3 HAULAGE COSTS AND OTHER CONSIDERATIONS

In addition to disposal tipping fees, haulage costs to export destinations will determine the relative economic advantage of waste export.

Haulage costs including the use of the vehicle, driver wages, fuel and other operating expenditures vary according to the type of vehicle used, the potential for backhaul revenues, tolls, delays associated with weigh stations, border crossings, traffic, loading and unloading and other factors. Average cost data per tonne–mile or per tonne–minute, therefore, provide only a very rough indication of costs in an actual hauling decision.

Of particular importance is whether or not a particular route permits two trips per day for the same vehicle, as is possible for example, from the GTA to the greater Buffalo or Niagara Falls, New York areas. Discussions with industry participants suggest that the costs for hauling on such routes (i.e., 100 miles each way) are in the order of $15 to 20 per tonne (assuming an empty return trip). This is consistent with data reported on a cost per tonne–minute in a 1991 study for the Province on the Physical and Economic Dimensions of Municipal Solid Waste Management in Ontario as well as with an estimate on the cost per mile for a tractor–trailer truck reported in the August 1991 edition of Waste Age. Haulage costs to a more distant U.S. location that entail a single trip per day are on the order of $30 to $45 per tonne.

In addition to the dedicated haulage costs, the industry will also consider opportunities to combine waste haulage with haulage of other materials in the return direction. It was suggested for example, that aggregate materials can be transported into the GTA and waste picked up for the return trip of the vehicle. Clearly where these opportunities exist the economics of long distance waste haulage is improved.

In the absence of such special circumstances, the data in Table 13 reflect the typical cost comparisons facing a private waste management company in selecting between Ontario and U.S. disposal sites. The U.S. cost is based on the sum of statewide averages for disposal costs and a typical hauling fee to the U.S. site ($17 per tonne for border states near to the Ontario site, $35 for others). The source of the waste is assumed to be in close proximity to an Ontario municipal site. Each Ontario site is compared with those states that offer the closest geographic competition.

Table 13: Comparison of Ontario Tipping Fees with U.S. Disposal Costs (including haulage costs) 1992

Ontario Municipal Landfill Tipping Fees		U.S. Tipping/Haulage Costs	
	$/tonne		$/tonne
Golden Horseshoe Area			
Durham (Brock West)	152	New York	103
Hamilton–Wentworth	180	Pennsylvania	108
Region of Peel (Britannia)	150	Michigan	76
York Region (Keele Valley)	152	Ohio	72
Southwestern Ontario			
Essex County	45–77	Michigan	58
Waterloo Region	65		
Other			
Peterborough	150	New York	121
		Michigan	76

(Revised November 4, 1993)

It is important to note that these comparisons are only illustrative of the typical relative economics of Ontario versus U.S. disposal, since costs will differ for each operator, depending on actual destinations in each state, whether the company owns a U.S. site, whether the company is obtaining a discount from listed tipping fees in the U.S., backhaul transport cost savings, and other factors. We also note that the table above is based on the average landfill costs in each state, and individual sites may offer greater savings than shown in the table. In the absence of a direct survey of Ontario waste management companies, it was not possible to obtain the detailed operating data that would be necessary to make a precise analysis of the cost competitiveness of Ontario landfills.

A significant differential in haulage/tipping fee costs between jurisdictions must generally exist in order for the industry to consider moving materials beyond the closest disposal facility. In addition to this obvious factor, more subtle economic decisions may also be involved. In the Ontario context, the lengthy process involved in gaining approval for new disposal capacity, limited service areas of private landfills and material bans at municipal disposal facilities means that private waste management companies with their own landfill sites may have a strong local advantage over their competitors without facilities. A longer term decision must be made regarding the speed at which the disposal capacity is utilized. Where alternatives exist, such as export at a reasonable cost, it may be prudent to preserve this capacity for future use.

Similarly, while a processing facility may be initially designed for recycling of materials, the alternative of utilizing the facility as a simple transfer station prior to disposal depends directly on the costs of processing and revenue from material sales versus the costs of disposal. Unless the differential is small, consideration will not likely be given to the longer term value of establishing markets for recycled material and utilizing the full potential of available recycling technology.

Due to these considerations, there is not a single price point at which an Ontario landfill would become competitive for all operators. Clearly, more operators would find it advantageous to discontinue waste exports as the price of Ontario landfill tipping fees approached the sum of U.S. tipping fees and hauling costs as shown in Table 13. The data in this table suggests that waste exports would be nearly eliminated for wastes eligible for municipal landfilling in the Golden Horseshoe area if tipping fees were in the range of \$80 to \$90 per tonne, and might be substantially reduced if the tipping fees were close to \$100 per tonne. In border communities, U.S. sites offer a greater competitive threat (since transport costs to the U.S. site may only be minimally above those to an Ontario site), and to be competitive, Ontario sites would have to nearly match the range of tipping fees shown in Table 13 for the relevant border state. It should be noted, however, that a detailed analysis of individual company operating statistics (e.g., knowledge of discounted rates that may be available to some Ontario firms on U.S. disposal activities) would be needed to confirm these broad conclusions.

Finally, although an examination of the waste management industry structure is outside the scope of this study, it appears that the ownership patterns within the industry may have a significant impact on the export issue. There may be an economic advantage, for example, for a waste management firm to utilize its own site for disposal rather than closer facilities in spite of an apparent difference in costs.

3.4 TRENDS IN EXPORT RELATED FACTORS

This study has focused on an analysis of Ontario waste exports during 1992. It is recognized however, that the waste management industry is very competitive and dynamic. This section notes some of the trends in export related factors which the industry may respond to in 1993 and beyond.

3.4.1 Adjustments in Ontario Disposal Facility Tipping Fees

In view of the significant decline in private sector waste deliveries to municipal facilities, some Ontario municipalities have considered proposals to reduce landfill tipping fees. In particular, Metro Toronto and the Region of Peel have considered lowering fees from the current range of $150 per tonne to approximately $100 per tonne. Decisions of this magnitude could significantly alter the economics of waste export and the flow of waste between municipalities in the Golden Horseshoe area. As of March 1993, Metro's Management Committee had not supported fee reductions for 1993, this position is subject to Metro Council approval and continues to be debated in the context of the 1993 Budget. There is no indication of the Region of Peel's position. (See Appendix E for updated tipping fees at landfills in the Golden Horseshoe area.)

The County of Essex lowered fees at its three landfills in February of this year to $40 per tonne in an effort to attract additional private sector waste. The fees previously charged ranged from $45 to $77 per tonne. It is uncertain at this time whether the lower fee will curb waste exports.

Similar price adjustments are occurring in the private waste management industry in the province. The emergence of U.S. export as a viable option has prompted development of an important waste brokerage activity and increased competition in the Ontario market by U.S. based waste management firms.

Ontario private waste management firms have indicated that tipping fees at private IC&I and C&D waste transfer/processing facilities have decreased from about $130 per tonne in the fall of 1992 to about $75 to $100 per tonne in March 1993. OWMA staff indicated that these rates are insufficient in many cases to support recyclable material processing and marketing.

3.4.2 Legislative, Regulatory Trends in the U.S.

The concern over interstate and international waste transport remains strong in the U.S. and numerous bills have been reintroduced at the Federal level to provide States with control over waste import. Concurrently, individual states are continuing to strengthen where possible their waste planning capability by requiring more information from private waste managers. In Michigan, for example, Wayne County is finalizing more stringent import permit procedures which will require landfill owners to negotiate agreements regarding imported wastes.

It has been reported by the National Solid Waste Management Association that as the new RCRA Subtitle D regulations take effect in the U.S., and as landfill capacity continues to diminish in certain regions, tipping fees will generally increase. However, the level of increase will vary at individual sites and will depend in part on the environmental protection measures currently in place.

3.4.3 Future Waste Export Monitoring Initiatives

Efforts are currently being made by Environment Canada and the U.S. Customs Service to more effectively track the cross border movement of waste in future. These initiatives are described below.

Environment Canada

In order to develop a more comprehensive approach to the management of international movement of waste, Environment Canada is proposing to establish a system to manage transboundary movement of municipal solid waste (MSW).

As a first step, the federal government amended the Canada–U.S. Agreement on the Transboundary Movements of Hazardous Wastes and their Disposal to include MSW. Once implemented by means of national legislation (Canadian Environmental Protection Act) and regulations, these new provisions would require pre–notification and consent from the receiving jurisdiction for movements of MSW across the border and would require implementation of a tracking system for these wastes. No timetable has been established for necessary legislative amendments. In the interim, the federal government has indicated that, in consultation with stakeholders, a voluntary notification system will be put in place.

U.S. Customs

Effective March 1, 1993, U.S. Customs in the Buffalo District required the filing of a formal entry summary for the importation of residential and IC&I waste and C&D debris which is imported through the Niagara Region crossings. As such, all vehicles carrying waste loads for disposal will now be subject to more rigorous entry requirements and will be required to provide more detailed information on the amount and type of waste as well as the identification of the origin and destination of the waste.

It is expected that the other U.S. Customs Districts will implement similar requirements at other Ontario–U.S. crossing points in the near future.

U.S. Custom officials in Buffalo have advised that this data will be publicly available, likely in a consolidated form.

Trucking companies or custom house brokers will also be required to post a surety bond and to pay a higher merchandise and processing fee. Neither of these costs, however, are expected to be an economic deterrent to future waste exports.

4.0 CONCLUSIONS

During 1992, export of Ontario waste to U.S. disposal facilities was a significant component of the private sector waste management system. Based on our analysis of available U.S. Customs data and a border monitoring exercise undertaken for this study, it is estimated that approximately 1.3 million tonnes of solid non–hazardous waste were exported from Ontario to U.S. disposal facilities over the year. Estimates compiled from U.S. and Ontario waste management officials and other available data sources tend to confirm this estimate as reasonable. Given a lack of comprehensive monitoring or reporting, no accurate record of export activity for the year is available.

This significant transborder movement has resulted in a sharp reduction in waste receipts at Ontario municipal landfills and a subsequent loss of revenue for municipalities. In importing U.S. jurisdictions, flows of Ontario waste has added to the controversial issue of interstate waste movement.

A set of interrelated factors contributing to waste export are evident, including:

a) a relatively unrestrictive U.S. regulatory and policy environment;
b) restrictions on service areas at existing private landfill sites and material bans at municipal landfills;
c) the absence of federal export control; and
d) significant differences in the total disposal costs, tipping fees and haulage, between facilities in Ontario, particularly the Golden Horseshoe Area, and available U.S. disposal sites.

APPENDICES

Appendix A

Phase 1 Report – Export of Solid Non–Hazardous Waste from Ontario: Data Assessment and Phase 2 Recommendations

EXPORT OF SOLID
NON-HAZARDOUS WASTE
FROM ONTARIO

PHASE 1 REPORT – DATA ASSESSMENT
AND PHASE 2 RECOMMENDATIONS

PREPARED FOR:
ONTARIO MINISTRY OF THE ENVIRONMENT
WASTE REDUCTION OFFICE

PREPARED BY:
GARTNER LEE LIMITED

JANUARY, 1993

GLL 92–304

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1.0 U.S. CUSTOMS AND CENSUS BUREAU DATA

1.1 DATA SOURCE ASSESSMENT

Solid non–hazardous waste entering the U.S. is classified by U.S. Customs under at least two tariff or commodity code numbers; "other waste and scrap of paper" (which apparently includes most residential, commercial and office waste) and "other wood waste and scrap" (which apparently includes most construction and demolition debris). The declared value of these loads by carriers ranges from one dollar to hundreds of dollars.

Census Bureau Published Data

Information collected by U.S. Customs on waste importations including the origin, destination, commodity code number and value are sent to the U.S. Census Bureau of the Department of Commerce for consolidation and reporting. U.S. Census Bureau was contacted by the study team and requested to provide published data on the total tonnages of waste in the two commodity categories that were imported into the U.S. from all Ontario border crossing locations. This data was requested for a 12 month period ending October 1992.

The data was received from the Census Bureau but found to be incomplete. Commodities declared as having a dollar value of less than $1,250.00 are not published. Most solid non–hazardous waste exports had been excluded from the consolidated data.

Buffalo District Reports

The study team has received a copy of a report on 1991 waste imports, prepared by Operational Analysis Staff of U.S. Customs in the Buffalo, New York District. This report provides an estimate of solid non–hazardous waste imported through the Buffalo District. All relevant waste loads were recorded defined by the codes noted above.

The study team has also been provided with similar data for waste irrespective of the dollar value at declaration imported through the Buffalo district during the first quarter of 1992.

Detroit and Ogdensburg Data

Officials from U.S. Customs Districts in Detroit, Michigan and Ogdensburg, New York were contacted to determine if similar internal studies have been undertaken to estimate the amount and type of solid non–hazardous waste imported through their district ports. We have been advised that no studies have been done, and no comparable data has been compiled. Furthermore, the procedure for initiating such a study by customs officials has not yet been determined.

In summary, our investigations to date have determined that comprehensive data are not readily available from U.S. Customs on Ontario waste exports.

The best available confirmed data is that which the Buffalo district compiled for 1991 and quarter one of 1992. This data reflects all loads declared as either "other waste and scrap of paper" or "other wood waste and scrap". The limitations of the data source include the following:

a) there are no comparable data for Ogdensburg or Detroit Districts;
b) the data may overstate waste for disposal if loads contain materials destined for recycling;
c) the data may understate waste quantities if other classification codes are being used to describe waste; and
d) absence of monthly or quarterly 1991 data.

1.2 RECOMMENDATION AND WORK PROGRAM

Individual vehicle declaration records collected by U.S. Customs is the only comprehensive tracking system for solid non--hazardous waste exports from Ontario.

We recommend that the study proceed to Phase 2 using the confirmed customs data available in the Buffalo District reports as the primary data source. The limitations noted will be addressed as far as possible through supplementary information gathered through the border monitoring exercise.

We also recommend that investigations be continued to determine what procedures or authorizations are required to initiate the preparation of consolidated reports at the Detroit and Ogdensburg districts. In our view, however, it is unlikely that any further data will be available from these Districts within the February 26 timeframe of the study.

Utilizing the Buffalo data as the primary source, we recommend the following estimation procedure:

a) review selected Ontario municipal landfill records to determine seasonal variability;

b) adjust Buffalo 1991, Quarter 1, 1992 data for anticipated seasonal trends, estimate 1992 exports through Buffalo;

c) if survey questionnaire is undertaken:

    i) determine proportion destined for recycling and adjust estimate;
    ii) determine proportion of waste not captured in the two classification codes and adjust estimate.

d) with either questionnaire or vehicle count; determine Detroit and Ogdensburg exports during the survey period compared to Buffalo exports during the survey. Use these ratios to extrapolate estimated 1992 Buffalo data to total 1992 estimate.

Work Program

a) Contact U.S. Customs officials in Buffalo and obtain quarterly data on solid non-hazardous waste imports in 1991 and 2nd through 4th quarter 1992 data.

b) Make inquiries with U.S. Customs officials in Buffalo to confirm the types of data which are sent to the Bureau of Census for publishing (i.e., what happens to data records with a value of less than $1,250.00) and procedures for initiating additional data reports.

c) Use the 1991/1992 data on waste imports obtained from U.S. Customs in Buffalo with information collected from the border monitoring program to estimate the amount of waste imported through each district port in 1992.

2.0 BORDER MONITORING PROGRAM

2.1 VEHICLE DRIVER QUESTIONNAIRE

2.1.1 Data Source Assessment

This approach would involve U.S. customs officials administering a questionnaire to drivers during normal customs declaration. The questions would ask for additional information on the quantity and type of waste being exported as well as the origin and destination of the waste.

Letters have been sent to the three U.S. Customs District offices in southern Ontario requesting approval for the survey. Each district was also provided with a copy of the proposed one page questionnaire which would be used by customs officials.

The study team has contacted each of the three districts to determine the status of our request. Officials from U.S. Customs in Detroit advise that a decision on this matter could be made by January 22, 1993. A decision from U.S. Customs in Buffalo may not be available until January 29, 1993. We were not advised of a date when a decision would be made by customs officials in Ogdensburg.

The survey is expected to be a key source of information on City/State and facility destinations which can augment the destination records obtained from U.S. States.

As a single data source, the survey method provides limited information on which to base an estimate of 1992 exported waste quantities. However, the composition data will help to clarify the interpretation of Customs declaration records and to identify waste exports that are being classified in commodity codes other than the two key codes reviewed in the Customs report. In addition, the questionnaire will provide insight into the proportion of the waste stream destined for recycling. The facility type identified in the survey will indicate the proportion of waste being exported to recycling facilities. Hence, the information can be used to adjust the available Customs data.

The data recorded for each port can be compared to the quantities exported through Buffalo crossings and these ratios will be used to extrapolate the Buffalo 1992 estimates to a Province wide estimate.

A questionnaire is the only approach we have confirmed which will provide specific data on the municipality of origin for exported ICI and C/D waste.

2.1.2 Recommendation And Work Program

A survey of vehicle drivers is a key source for obtaining information on the sources, destinations and composition of waste exports.

As noted in Section 1.2, we recommend that the questionnaire data be used to adjust the available waste quantity data from the Buffalo district and to extrapolate the Buffalo data to a 1992 estimate.

If the questionnaire method is approved, additional contact would be required with customs officials prior to implementation in order to clarify the questionnaire and to finalize the arrangements for the delivery of completed survey forms to the study team. These discussions should commence no later than February 1, 1993 and the survey should be administered no later than February 5–12, 1993. The study team must have results of the questionnaire by February 12 in order to meet the February 26 timeframe.

In view of the above, the decision on whether to proceed with the questionnaire should be made no later than January 29, 1993.

Work Program

If the questionnaire method is approved by one or more of the U.S. Customs Districts, the activities outlined below would be undertaken.

a) Meet with appropriate district staff to:

   i) clarify and if necessary refine the questionnaire, (this would include the preparation of a glossary of waste management terms used in the questionnaire); and
   ii) finalize the arrangements for delivering the completed questionnaires to the study team.

b) Prepare computer spreadsheet and enter data collected from the survey.

c) Consolidate data with information collected from other methods and prepare estimate of 1992 exported waste quantities.

2.2 VISUAL COUNTING OF VEHICLES

2.2.1 Data Source Assessment

This method would involve the monitoring of trucks on the Canadian side of the border. Notification and approval from Canada Customs to implement the monitoring exercise would be required.

The monitoring would be based on the visual identification and counting of vehicles expected to be carrying waste for export. Truck type, signage and other markings would be used by study team members to identify waste haulage vehicles.

The data obtained from this exercise will be limited to aggregate waste tonnage and volume estimates. No information will be collected on the origin, destination and composition of waste loads.

2.2.2 Recommendation And Work Program

The vehicle counting method could be used as a "fall back" option if the questionnaire method is not approved by U.S. Customs.

Based on our investigations of other data sources, it is apparent that most of the waste exported to the U.S. is through the border crossings in Niagara Falls and Fort Erie. A significant amount is also apparently exported through Windsor. Counting of waste vehicles would be carried out at each of these border crossing locations.

Although the vehicle count cannot be used to adjust the Buffalo data, it will be useful as an indication of the waste haulage vehicle crossings in Detroit and Ogdensburg District areas relative to Buffalo. These ratios can be used to extrapolate the 1992 Buffalo District estimates.

The vehicle count also provides an indication of whether waste haulage trucks are causing line–ups or delays at the border crossings.

Work Program

a) Contact Gordon Owen of Environment Canada regarding his discussions with Canada Customs on this matter. If necessary contact Roberta Goule directly to seek approval for implementing a vehicle counting exercise.
b) Prepare survey materials and forms which would be used by study team members to visually identify and record the number of vehicles.
c) Assign and train staff to carry out vehicle counting.
d) Prepare spreadsheet and enter collected data.
e) Consolidate data with information collected from other sources.

3.0 U.S. SOLID WASTE MANAGEMENT OFFICIALS

3.1 DATA SOURCE ASSESSMENT

The study team considered U.S. states generally within the north east and central regions of the U.S. to be potential destinations for exported Ontario waste, based on information available from other sources. Delaware and Maryland were considered to be highly unlikely destinations due to their size and were excluded from the contact list, Kentucky was identified as an additional potential location, for a net total of 21 states.

To date, contact has been made with waste management officials from 17 of the 21 U.S. states. Each jurisdiction was asked to describe the legislative/regulatory framework in place to monitor or control disposal of out–of–state waste and to describe the waste quantity data, facility destinations, tipping fees or other relevant information available to the study.

From a regulatory perspective, the survey indicated that six of the states, Pennsylvania, Ohio, Indiana, Wisconsin, New Hampshire and Maine currently monitor out–of–state waste through a regulated reporting system. In each of these states, landfill operators are required to file reports which identify waste quantities received by origin.

Vermont and Iowa regulate out–of–state waste by restricting the service areas of disposal facilities. No Ontario waste is legally imported.

Michigan previously required counties to define service areas in their waste management plans. In May 1992, however, Michigan's provision was challenged in the Supreme Court, found to be in contravention of interstate commerce rights and struck down. Michigan officials at the state level were unable to provide any quantity data. To date, four of the six county level officials have been contacted and in only one case are there any public records of out of state waste available. Discussions with county officials in Michigan has provided some insight into local conditions and facilities. At the suggestion of one county official, contact was made with the BFI facility in Washingtonwa County; to take this any further a follow–up letter is required. The impression left was that release of the information we require would involve a corporate policy decision by BFI.

State and subsequently regional level officials in New York state were contacted. While some insights were gained, for example, disposal facility destinations, no public data on the origin of Ontario waste received at disposal facilities in New York is available. As in Michigan, officials suggested that facilities be contacted directly.

Where states indicated that specific data is available, officials were asked to forward the most recent figures. In many cases, reports for 1992 are not yet available, however, all agreed to cooperate as far as possible.

3.2 RECOMMENDATION AND WORK PROGRAM

State officials have provided valuable insight into the diverse range of regulatory approaches in the Northeast and Central States.

States with formal reporting systems will provide information on the quantity, type and seasonal variability of waste imports from Canada (Ontario). Tipping fees, and in some cases state and county import surcharges, will also be provided.

This is a valuable source of data which should be investigated further in Phase Two. At the data consolidation and assessment stage, follow–up with officials particularly in the key states (Ohio, Pennsylvania, Michigan and New York) may be required. Direct contacts with disposal site operators is unlikely to yield consistent or reliable data.

Work Program

a) Complete all initial state contacts.
b) Complete inquiries at the county level in Michigan and regional level in New York.
c) Possible follow–up with disposal facility operators in Michigan and New York state (decision required).
d) Prepare follow–up letters to all officials.
e) Consolidate regulatory and facility information.
f) Consolidate waste quantity data.
g) Follow–up with states to identify C/D waste sites, where required.

4.0 CONGRESSMAN BILL PAXON

4.1 DATA SOURCE ASSESSMENT

New York State Congressman Bill Paxon and his staff have apparently compiled significant amounts of information on waste imports into the U.S. This includes Bills put forward by his office designed to restrict the movement of this waste in future.

A letter has been sent to Congressman Paxon outlining the types of information we are seeking to collect and the information his office will be able to provide.

To date, we have not received a response to our letter.

4.2 RECOMMENDATION AND WORK PROGRAM

Contact Congressman Paxon's office to determine the time frame for providing data to us. No further action required until data received.

5.0 SENATOR JOHN GLEN AND GENERAL ACCOUNTING OFFICE RESEARCH

5.1 DATA SOURCE ASSESSMENT

Senator John Glen of Ohio, Chairman of the Senate Committee on Government Affairs, has an interest in the issue of inter state waste haulage and disposal. He has directed the General Accounting Office (GAO) to prepare a report which among other things will investigate waste disposal practices.

From our preliminary discussions with his office and the GAO, the study will include a legislative review and accumulate any available data.

Senator Glen is likely to be interested in the results of this study and may be willing to lend his support in getting the border monitoring methods underway. Senator Glen's staff suggested that a letter be sent to provide background on the study and to request the Senator's involvement. A draft letter was prepared and sent to the WRO for review on January 15.

5.2 RECOMMENDATION AND WORK PROGRAM

Although Senator Glen's office does not appear to have any data at this time, the results of the GAO report will be of interest to the WRO. Senator Glen's office will be a valuable source to keep abreast of any legislative change which may be brought forward under the new administration.

There appears to be some potential to get support for U.S. Customs cooperation on this study from the Senator.

Work Program

a) Follow-up with GAO on study terms of reference and progress.
b) Send correspondence requesting Senator Glen's support for the study.

6.0 REGIONAL AND LOCAL MUNICIPALITIES IN ONTARIO

6.1 DATA SOURCE ASSESSMENT

Hamilton-Wentworth

Regional government waste management officials have been contacted. The Region does not have any mechanism to monitor the export of waste from its jurisdiction. Officials have provided tables showing the decline in annual waste quantities disposed of at Region owned facilities from 1990 to 1992 inclusive.

Halton Region

Halton Region exported both residential and ICI waste in 1992. Records of waste quantities, facility destination, haulage costs and disposal fees will be available for wastes managed by the Region.

Kingston

The City of Kingston and the Township of Kingston has used advertising to identify disposal facility operators in either Canada or the U.S. who are willing to accept approximately 44,000 tonnes of Kingston area waste per annum.

Initial contacts have been made with the City of Kingston to determine whether the City would be prepared to release the information and/or contacts made through this exercise. City Council is scheduled to make a decision by mid February 1992. Once a decision has been reached, the file on responses will be made available to the study. This source of current industry interest and pricing can be compared to published tipping fees and transportation cost data.

Metropolitan Toronto

The information provided in the July 15, 1992 Commissioner of Works report to the Metro Management and Works Committee has been reviewed and follow up conversations held with relevant officials.

Metro has compiled a partial list of disposal facilities in the U.S. accepting Ontario waste and has estimated export quantities from Metro. This information is based on a Metro official's understanding of the Metro area waste management factors and contacts with waste management firms operating in the Metro area.

This information provides a point of comparison for export quantity estimates produced through other sources and helps to confirm export destinations.

6.2 RECOMMENDATION AND WORK PROGRAM

a) Contact Metro again to obtain recycling facility tipping fee data.
b) Initiate contact with Halton and Peel Region officials.
c) Review waste export estimates made by Metro, Halton, Peel and Hamilton/Wentworth as a point of comparison for other data sources.
d) Maintain contact with Kingston for quotation file.

7.0 WASTE REDUCTION OFFICE DATA BASE

7.1 DATA SOURCE ASSESSMENT

The Waste Reduction Office has collected information from municipalities in Ontario which indicates if waste is known to be "exported" to other jurisdictions for disposal. "Export" destinations could be within Ontario, another province or the U.S.

Ron Nielsen has advised that no information has been collected from municipalities on the quantities and types of waste being exported or the destination of the final disposal site.

7.2 RECOMMENDATION AND WORK PROGRAM

Ron Nielsen has advised that there is limited value to the data collected from municipalities on waste exports. However, the study team will be provided with the data records for review.

Work Program

a) WRO office to provide a listing of municipalities indicating waste export.
b) Review data records collected from municipalities or contact officials directly, if necessary.

8.0 MOE INVESTIGATIONS AND ENFORCEMENT BRANCH (IEB)

Contacts: Mr. Jim Thompson, Acting Area Supervisor, Investigative Support Services
Mr. Chris Williams

8.1 DATA SOURCE ASSESSMENT

Vehicle Inspection Program

a) IEB collected data on the movement of solid non–hazardous waste in 1992 as part of a Vehicle Inspection Program (VIP).

b) Investigation was initiated by IEB in January 1992 when officials identified a significant increase in the movement of this waste.

c) Initiated a series of vehicle inspections on different days throughout 1992 at the Fruitland QEW weigh station operated by MTO (five or six days in total).

d) The purpose of these inspections was to gather information on the origin of the waste, the carrier and the destination (no weights were recorded).

  i) For each vehicle stopped, copies of all records were made including vehicle registration and ownership, drivers licences and waybills.

  ii) This data was entered into a computer data base for manipulation and analysis to identify illegal carriers and transfer operations.

  iii) Data can apparently be manipulated to produce listing of sources/carriers/receivers of solid non–hazardous waste.

e) Information collected from the VIP is confidential since it was gathered through the powers of inspection according to Section 130 of the EPA.

f) Chris Williams has advised that if we can get assurances from the WRO that the purpose of our study is for administering of the EPA, the information collected from the VIP could be provided – Mr. Williams to discuss this issue with Ron Nielsen.

General Information Provided by IEB Officials

a) The majority of solid non–hazardous waste exported to the U.S. originates from approved transfer stations in Ontario, primarily in the GTA.

b) Most of the carriers are American owned (cheaper for Ontario waste management companies to sub–contract to independent U.S. carriers).

c) The major destinations are disposal facilities in Ohio and Pennsylvania – the major site in Michigan receiving Ontario waste (City Sand and Gravel Landfill) recently closed.

d) Most of the waste is shipped through Canadian/U.S. border crossing points in Niagara Falls and Fort Erie.

e) The three major waste management firms involved in waste export are BFI, WMI and Integrated Waste Services (IWS).

  i) IWS is based out of Buffalo, New York and works closely with the Santarosa Group for transportation services.

    ii) IWS ships waste to the Modern Landfill in New York state.

    iii) Significant amounts of ICI and C/D waste are shipped to BFI owned landfills in Ohio and Pennsylvania.

f) Al's Waste Control is currently shipping waste to Michigan.

g) I. Waxman and Sons owns a transfer station in Hamilton – acts as a broker for a number of disposal sites in the U.S. – a number of independent haulers deliver waste to this transfer station.

h) Some waste shipped as far as Tennessee and Indiana.

i) The two main transportation routes used to ship waste by tractor trailers from the GTA to the U.S. pass through two vehicle weigh stations operated by MTO. These are the Fruitland QEW weigh scales in Niagara Falls and the Putnum weigh scales in London. These two locations would be suitable sites to survey, monitor or inspect vehicles carrying solid non–hazardous waste, however, these are the busiest weigh stations in terms of volume of traffic and it may be difficult to obtain MTO cooperation.

IEB Information Requests to U.S. Customs

a) IEB advise that U.S. Customs is the only agency that has a tracking system for solid non–hazardous waste (due to declaration requirement).

b) IEB formally requested data from U.S. Customs on all haulers carrying C/D waste from Ontario to the U.S., however, it took about six months to obtain this data and the information provided was incomplete and not applicable (for example, information was provided on recycling paper shipments made by Domtar). IEB will be contacting U.S. Customs in future to acquire the appropriate data.

c) Chris Williams has a number of contacts at U.S. Customs in Buffalo – apparently he has a good understanding of the data collected by U.S. Customs and how it can be accessed on the computer.

Illegal Transfer Stations

a) Illegal transfer operations are undertaken by companies without an approved transfer site and who previously transported waste directly to municipal landfills (e.g., Keele Valley, Brock West and Britannia) prior to significant increases in tipping fees at these sites – the waste is delivered back to their yard, dumped and then loaded into tractor trailers.

b) Majority of waste exported to the U.S. is in tractor trailer loads. There also may be some limited direct haul in bordering provinces/states.

8.2 RECOMMENDATION AND WORK PROGRAM

IEB appears to have a significant data base on the origins, carriers and destinations of solid non–hazardous waste, however, the computerized data does not include waste quantity information.

IEB officials also have working experience and knowledge of U.S. Customs data and could assist in the identification and collection of this information.

Further discussions with IEB may provide estimates of the amount of waste exported from illegal transfer stations.

Work Program

a) We recommend that a meeting be set up with GLL, the WRO and IEB to discuss the potential to review data collected from the VIP and U.S. Customs, particularly to confirm major origin/destination patterns and to clarify if weight records from the waybills were retained.

b) Further discussions with IEB officials to better understand Customs data potential and to pursue IEB contacts with Customs officials.

9.0 CERTIFICATES OF APPROVAL FOR PRIVATE WASTE TRANSFER AND PROCESSING FACILITIES

Contacts: MOE Central Region Officials – Toronto and York–Durham District Offices

9.1 DATA SOURCE ASSESSMENT

MOE Central Region officials were contacted by the study team to identify the types of information which could be obtained from a review of Certificates of Approval (C of A) issued for private transfer and processing facilities in the Greater Toronto Area (GTA) and some adjacent jurisdictions.

The objective was to identify any conditions in the C's of A which would restrict the movement of waste to disposal sites outside of Ontario or which would require facility owners to submit reports to the MOE on waste quantities and types and origin and destination data.

MOE officials advised that the majority of sites in the GTA are not restricted on the location of the final destination, provided it is an approved waste disposal site. In limited cases, the C of A specifies that waste must be disposed of in an MOE certified disposal site in Ontario.

According to an MOE official, only about five percent of the existing transfer/processing facilities in Central Region have a reporting requirement to the MOE. However, it is becoming common for MOE Central Region officials to impose reporting requirements to the MOE as a condition for proponents to receive a C of A to operate new transfer and processing facilities.

There are limits placed on the amount of waste which can be received by a particular site per day and the amount of waste which can be stored on site for a given time period.

In some cases, operators are required to maintain on–site records of the quantity, type and source of incoming waste and the quantity, type and destination of outgoing waste. This information must be available to the MOE and/or the local municipality where the facility is located, for inspection at any time without notice. However, MOE officials are uncertain if these records are being maintained and the types of information which are available. An MOE official advised that a letter would have to be submitted to the District Officer requesting approval for an MOE or other designated provincial officer to review individual site records.

9.2 RECOMMENDATION AND WORK PROGRAM

It is uncertain as to the records and types of information which are required to be maintained on–site for individual facilities. In order to assess this source a preliminary review of C's of A is still required. We understand that the WRO has copies of the relevant documents from Central Region.

Work Program

a) WRO provide the C's of A to the study team for review, to determine record keeping and/or reporting requirements.

b) Based on the review, make a decision with WRO whether this source will be pursued.

It may be worthwhile, for example, to review records for certain sites which have been identified by other sources as major waste exporters if they are available through MOE inspection.

10.0 PUBLICATIONS

10.1 DATA SOURCE ASSESSMENT

Solid Waste Digest has been reviewed as a source of data on disposal facility tipping fees.

The most recent complete edition we were able to acquire to date is November 1992. The February 1992 Midwest and Central Edition and October 1992 Northeast Edition were also reviewed.

This is a monthly publication produced by Regions. The subscription price for each region is $225/year. Back issues are available to subscribers for $35/each.

Although the Digest is not 100% comprehensive, for example some facilities appear in one edition then not in the next, it is considered to be a reliable source for this information.

An advantage of using this source is that specific facility fees and Regional weighted averages can be traced over a period of time (site capacity and MSW gate fees are used in computing the averages).

The digest does not provide any information on specific state, county or municipal surcharges for out of state waste.

In order to do a comprehensive review of tipping fees over 1992, back issues would have to be purchased and a review of the data undertaken. At this point in the study there does not appear to be any need for this level of detail.

The *National Solid Waste Management Association* (NSWMA) has prepared a report on inter state movement of waste. A copy of this report has been requested however no specific data are anticipated. The report may discuss general economic/legislative factors contributing to long distance waste haulage.

SWANA has produced a directory of U.S. landfill facilities including operator contact, mailing address and phone number. The cost of this directory is $695.00. No other data or relevant information was identified.

10.2 RECOMMENDATION AND WORK PROGRAM

a) Utilize the Solid Waste Digest issues on hand to indicate tipping fees at facilities which have been identified as accepting Ontario waste, and supplement where necessary with surcharge information from state officials. Summarize this data.

b) Where necessary, contact individual U.S. facilities to obtain tipping fee schedules (at least three facilities of interest are not listed in the digest).

c) Review available back issues to comment on any price movements of interest.

d) Review NSWMA report.

11.0 ASSOCIATION OF MUNICIPAL RECYCLING COORDINATORS

11.1 DATA SOURCE ASSESSMENT

The Association of Municipal Recycling Coordinators (AMRC) was formed in 1987 by municipal waste management professionals to facilitate the sharing of waste management data and experience among municipalities in Ontario.

The AMRC maintains a data base which tracks municipal 3Rs programs and other waste management activities of its members. Part of this data base includes the identification of municipalities which are exporting waste to a landfill or incinerator in another jurisdiction. This jurisdiction could be located in Ontario, another province or the U.S. We understand that the types of waste which are covered in this data base are predominantly from residential sources. No information is likely to be available on the amount and types of ICI waste exported.

The AMRC data base also contains a listing of the tipping fees charged at municipal landfill sites operated by its members, and in certain cases, the tipping fees incurred by municipalities who are exporting residential waste.

11.2 RECOMMENDATION AND WORK PROGRAM

The AMRC data base can assist in the identification of municipalities who are exporting residential waste to another jurisdiction for disposal. This information can be used to supplement the information obtained from the WRO data base and other sources. The AMRC data base can also provide information on tipping fees at municipal landfill sites in Ontario.

Work Program

a) Follow–up with AMRC officials to obtain relevant data on exporting jurisdictions and municipal landfill tipping fees.

12.0 ONTARIO WASTE MANAGEMENT ASSOCIATION

12.1 DATA SOURCE ASSESSMENT

The Ontario Waste Management Association (OWMA) has been contacted to provide specific information for certain components of the study.

The OWMA has not compiled a data base on the amount and types of waste exported by its members, or the final destination of exported wastes.

However, we expect that the OWMA can provide transportation information on standard industry haulage costs from various vehicle types. This information can be used to supplement the transportation cost data obtained from MTO data bases.

We also expect the OWMA to offer assistance in the identification of tipping fees charged at private transfer and processing facilities in Ontario and other relevant information for the study.

12.2 RECOMMENDATION AND WORK PROGRAM

The study team has good working relations with the OWMA. The Association has previously provided relevant information to the study team. We expect that this cooperation will continue throughout the study.

Work Program

a) Follow–up with OWMA officials.
b) Obtain relevant data where possible on standard industry haulage costs and tipping fees at private transfer/processing facilities in Ontario.

13.0 MINISTRY OF TRANSPORTATION AND TRIMAC TRANSPORTATION COST DATA

13.1 DATA SOURCE ASSESSMENT

The Ministry of Transportation has a data base containing detailed breakdowns of distances and driving times between numerous U.S. and Canadian points which will be made available to the study team.

The MTO software package can be used to match selected waste origin points with typical U.S. disposal destinations and to calculate these trucking distances.

With regards to the costs per tonne–kilometre, there is a semiannual report complied by Trimac consultants for the federal government which details the costs of operating various configurations of trucks by load type and province. This source can be used to obtain a typical estimate of haulage costs for vehicles most frequently used for long distance waste haulage.

13.2 RECOMMENDATION AND WORK PLAN

The data available on trucking costs and distances provides a sound basis to meet the requirements of the study.

Work Program

a) The cost estimate will be multiplied by typical distances to obtain a range of costs estimates for hauling waste between Ontario and the U.S..

b) Review, if available, waste haulage component of quotes obtained by the City of Kingston and compare to the MTO/TRIMAC results.

c) Compare estimated long haul costs with transportation costs for haulage options within Ontario, i.e., from the same transfer stations to Ontario landfills or recycling facilities.

d) Incorporate relevant tipping fees and surcharges to estimate total haulage and disposal cost options in the U.S. to Ontario options.

14.0 PRIVATE RECYCLING FACILITY OPERATORS

14.1 DATA SOURCE ASSESSMENT

One component of the study involves the collection of information to estimate the financial costs of waste export, including data on local Ontario tipping fees that are being avoided.

Avoided tipping fees apply to municipal landfills, and in some cases, particularly in the GTA, private recycling facilities. Operators of these facilities will be contacted to obtain tipping fees for the receipt and processing of recyclable materials.

ASSESSMENT OF WASTE EXPORT DATA AND INFORMATION SOURCES

Information Source/Data Assessement	Waste Export Quantities	Waste Export Types	Municipality of Origin	City/State Destination	Facility Destination	Haulage Distances/Costs	Tipping Fees		Other
							Ontario	U.S.	
1. U.S. Customs And Census Bureau Data	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX				
2. Border Monitoring									
A) Questionnaire	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX				
B) Visual Counting	XXXXXXXXXX								
3. State Solid Waste Management Officials	XXXXXXXXXX			XXXXXXXXXX	XXXXXXXXXX			XXXXXXXXXX	
4. Congressman Paxon									XXXXXXXXXX
5. Senator Glen									XXXXXXXXXX
6. Regional and Local Municipalities in Ontario	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXXXXXX	XXXXXXXXXX		
7. WRO Data Base			XXXXXXXXXX						
8. MOE Investigations and Enforcement Branch			XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX				
9. C's of A Review									
10. Publications									
A). Solid Waste Digest								XXXXXXXXXX	
B). NSWMA									XXXXXXXXXX
11. SWANA									XXXXXXXXXX
12. AMRC Data Base			XXXXXXXXXX				XXXXXXXXXX		XXXXXXXXXX
13. OWMA						XXXXXXXXXXXXXX	XXXXXXXXXX		XXXXXXXXXX
14. MTO And Trimac Data						XXXXXXXXXXXXXX			
15. Recycling Facility Operators							XXXXXXXXXX		

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Appendix B

Typical Border Monitoring Observation Form

Ministry of the Environment
Waste Export Study – Vehicle Monitoring
Daily Summary

Location: Peace Bridge

Recorded By: ____________________

Shift / Hour	Confirmed Waste Haulage Vehicles			Possible Waste Haulage Vehicles		
	Trailer		Smaller Trucks	Trailer		Smaller Trucks
	Single	Double		Single	Double	
Shift : Monday, February 8, 1993 06:00 a.m.						
07:00 a.m.						
08:00 a.m.						
09:00 a.m.						
10:00 a.m.						
11:00 a.m.						
12:00 p.m.						
13:00 p.m.						
14:00 p.m.						
15:00 p.m.						
16:00 p.m.						
17:00 p.m.						
TOTAL						

Appendix C

Border Monitoring Results

Actual Waste Haulage Vehicle Counts
Adjusted Waste Haulage Vehicle Counts

Actual Waste Haulage Vehicle Counts

WASTE HAULAGE VEHICLE MONITORING

BRIDGE/TRUCK TYPE	SUNDAY, FEBRUARY 7 – MONDAY, FEBRUARY 8									MONDAY, FEBRUARY 8 – TUESDAY, FEBRUARY 9									TUESDAY, FEBRUARY 9 – WEDNESDAY, FEBRUARY 10								
	22.00 p.m. – 06:00 a.m.			06:00 a.m – 13:00 p.m.			14:00 p.m. – 21:00 p.m			22:00 p.m. – 06:00 a.m.			06:00 a.m – 13:00 p.m.			14:00 p.m. – 21:00 p.m			22:00 p.m. – 06:00 a.m.			06:00 a.m – 13:00 p.m.			14:00 p.m. – 21:00 p.m		
	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T
1. PEACE																											
• Single Trailer	–	–	–	47	17	55.5	37	33	53.5	38	28	52	45	33	61.5	28	46	51	20	14	27	38	19	47.5	22	20	32
• Double Trailer	–	–	–	0	1	0.5	0	0	0	0	4	2	0	2	1	1	2	2	0	0	0	1	0	1	0	0	0
• Small	–	–	–	0	0	0	2	1	2.5	1	0	1	0	0	0	2	1	2.5	0	0	0	1	1	1.5	5	0	5
TOTAL	–	–	–	47	18	56	39	34	56	39	32	55	45	35	62.5	31	49	55.5	20	14	27	40	20	50	27	20	37
2. LEWISTON																											
• Single Trailer	3	12	9	15	15	22.5	13	25	25.5	13	5	15.5	14	11	19.5	16	15	23.5	7	3	8.5	13	11	18.5	24	13	30.5
• Double Trailer	0	3	1.5	1	1	1.5	0	1	0.5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
• Small	1	3	2.5	6	1	6.5	2	0	2	0	0	0	3	0	3	2	0	2	0	0	0	2	0	2	0	0	0
TOTAL	4	18	13	22	17	30.5	15	26	28	13	5	15.5	17	11	22.5	18	15	25.5	7	3	8.5	16	11	21.5	24	13	30.5
SUB-TOTAL OF 1 & 2	4	18	13	69	35	86.5	54	60	84	52	37	70.5	62	46	85	49	64	81	27	17	35.5	56	31	71.5	51	33	67.5
3. AMBASSADOR																											
• Single Trailer	9	6	12	25	11	30.5	1	6	4	9	2	10	26	9	30.5	10	5	12.5	5	6	8	42	3	43.5	5	4	7
• Double Trailer	1	4	3	2	0	2	0	4	2	0	1	0.5	10	0	10	2	0	2	1	0	1	4	1	4.5	0	0	0
• Small	0	0	0	7	0	7	4	0	4	0	0	0	7	0	7	2	0	2	0	0	0	6	0	6	3	0	3
TOTAL	10	10	15	34	11	39.5	5	10	10	9	3	10.5	43	9	47.5	14	5	16.5	6	6	9	52	4	54	8	4	10
4. BLUEWATER																											
• Single Trailer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
• Double Trailer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
• Small	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SUB-TOTAL OF 3 & 4	10	10	15	34	11	39.5	5	10	10	9	3	10.5	43	9	47.5	14	5	16.5	6	6	9	52	4	54	8	4	10
5. IVY LEA																											
• Single Trailer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
• Double Trailer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
• Small	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
GRAND TOTAL	14	28	28	103	46	126	59	70	94	61	40	81	105	55	132.5	63	69	97.5	33	23	44.5	108	35	125.5	59	37	77.5

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WASTE HAULAGE VEHICLE MONITORING

BRIDGE/TRUCK TYPE	WEDNESDAY, FEBRUARY 10 – THURSDAY, FEBRUARY 11									THURSDAY, FEBRUARY 11 – FRIDAY, FEBRUARY 12									FRIDAY, FEBRUARY 12 – SATURDAY, FEBRUARY 13								
	22:00 p.m. – 05:00 a.m.			06:00 a.m – 13:00 p.m.			14:00 p.m. – 21:00 p.m.			22:00 p.m. – 05:00 a.m.			06:00 a.m – 13:00 p.m.			14:00 p.m. – 21:00 p.m.			22:00 p.m. – 05:00 a.m.			06:00 a.m – 13:00 p.m.			14:00 p.m. – 21:00 p.m.		
	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T	C	P	T
1. PEACE																											
• Single Trailer	–	–	–	39	25	51.5	26	29	40.5	–	–	–	34	12	40	18	17	26.5	–	–	–	8	5	10.5	1	2	2
• Double Trailer	–	–	–	1	0	1	1	1	1.5	–	–	–	1	0	1	0	0	0	–	–	–	0	0	0	0	0	0
• Small	–	–	–	2	0	2	1	2	2	–	–	–	4	1	4.5	1	0	1	–	–	–	0	0	0	0	0	0
TOTAL	–	–	–	42	25	54.5	28	32	44	–	–	–	39	13	45.5	19	17	27.5	–	–	–	8	5	10.5	1	2	2
2. LEWISTON																											
• Single Trailer	–	–	–	38	8	42	6	14	13	–	–	–	23	14	30	7	9	11.5	–	–	–	3	3	4.5	1	0	1
• Double Trailer	–	–	–	1	0	1	0	0	0	–	–	–	1	0	1	0	0	0	–	–	–	0	0	0	0	0	0
• Small	–	–	–	7	3	8.5	4	0	4	–	–	–	2	5	4.5	1	0	1	–	–	–	0	0	0	0	0	0
TOTAL	–	–	–	46	11	51.5	10	14	17	–	–	–	26	19	35.5	8	9	12.5	–	–	–	3	3	4.5	1	0	1
SUB-TOTAL OF 1 & 2	–	–	–	88	36	106	38	46	61	–	–	–	65	32	81	27	26	40	–	–	–	11	8	15	2	2	3
3. AMBASSADOR																											
• Single Trailer	–	–	–	30	4	32	4	6	7	–	–	–	23	3	24.5	1	4	3	–	–	–	3	3	4.5	1	0	1
• Double Trailer	–	–	–	8	4	10	0	0	0	–	–	–	4	0	4	0	0	0	–	–	–	3	0	3	0	0	0
• Small	–	–	–	6	1	6.5	1	0	1	–	–	–	4	0	4	1	0	1	–	–	–	0	0	0	0	0	0
TOTAL	–	–	–	44	9	48.5	5	6	8	–	–	–	31	3	32.5	2	4	4	–	–	–	6	3	7.5	1	0	1
4. BLUEWATER																											
• Single Trailer	–	–	–	24	4	26	4	5	6.5	–	–	–	12	1	12.5	0	2	1	–	–	–	–	–	–	–	–	–
• Double Trailer	–	–	–	2	0	2	0	1	0.5	–	–	–	3	0	3	1	0	1	–	–	–	–	–	–	–	–	–
• Small	–	–	–	0	0	0	0	0	0	–	–	–	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–
TOTAL	–	–	–	26	4	28	4	6	7	–	–	–	15	1	15.5	1	2	2	–	–	–	–	–	–	–	–	–
SUB-TOTAL OF 3 & 4	–	–	–	70	13	76.5	9	12	15	–	–	–	46	4	48	3	6	6	–	–	–	6	3	7.5	1	0	1
5. IVY LEA																											
• Single Trailer	–	–	–	0	16	8	0	1	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
• Double Trailer	–	–	–	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
• Small	–	–	–	0	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	–	–	–	0	16	8	0	1	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
GRAND TOTAL	–	–	–	158	65	190.5	47	59	76.5	–	–	–	111	36	129	30	32	46	–	–	–	17	11	22.5	3	2	4

WASTVEHC wk3 22-Feb-93 92-304

WASTE HAULAGE VEHICLE MONITORING

BRIDGE/TRUCK TYPE	SATURDAY, FEBRUARY 13 – SUNDAY, FEBRUARY 14									TOTAL WEEK		
	22:00 p.m. – 05:00 a.m.			06:00 a.m. – 13:00 p.m.			14:00 p.m. – 21:00 p.m.			BY BRIDGE		
	C	P	T	C	P	T	C	P	T	C	P	T
1. PEACE												
• Single Trailer	–	–	–	–	–	–	–	–	–	401	300	551
• Double Trailer	–	–	–	–	–	–	–	–	–	5	10	10
• Small	–	–	–	–	–	–	–	–	–	19	6	22
TOTAL	–	–	–	–	–	–	–	–	–	425	316	583
2. LEWISTON												
• Single Trailer	–	–	–	–	–	–	–	–	–	196	158	275
• Double Trailer	–	–	–	–	–	–	–	–	–	4	5	6.5
• Small	–	–	–	–	–	–	–	–	–	30	12	36
TOTAL	–	–	–	–	–	–	–	–	–	230	175	317.5
SUB–TOTAL OF 1 & 2	–	–	–	–	–	–	–	–	–	655	401	900.5
3. AMBASSADOR												
• Single Trailer	–	–	–	–	–	–	–	–	–	194	72	230
• Double Trailer	–	–	–	–	–	–	–	–	–	35	14	42
• Small	–	–	–	–	–	–	–	–	–	41	1	41.5
TOTAL	–	–	–	–	–	–	–	–	–	270	87	313.5
4. BLUEWATER												
• Single Trailer	–	–	–	–	–	–	–	–	–	40	12	46
• Double Trailer	–	–	–	–	–	–	–	–	–	6	1	6.5
• Small	–	–	–	–	–	–	–	–	–	0	0	0
TOTAL	–	–	–	–	–	–	–	–	–	46	13	52.5
SUB–TOTAL OF 3 & 4	–	–	–	–	–	–	–	–	–	316	100	366
5. IVY LEA												
• Single Trailer	–	–	–	–	–	–	–	–	–	0	17	8.5
• Double Trailer	–	–	–	–	–	–	–	–	–	0	0	0
• Small	–	–	–	–	–	–	–	–	–	0	0	0
TOTAL	–	–	–	–	–	–	–	–	–	0	17	8.5
GRAND TOTAL	–	–	–	–	–	–	–	–	–	971	608	1275

WASTE HAULAGE VEHICLE MONITORING – SUPPLEMENTARY DATA

BRIDGE	DATE/HOUR	VEHICLE COUNT					
		CONFIRMED			POSSIBLE		
		Trailer		Smaller Truck	Trailer		Smaller Truck
		Single	Double		Single	Double	
1. PEACE	a) Thursday, Feb. 11						
	05:00 a.m. – 06:00 a.m.	5	0	0	3	0	1
	22:00 p.m. – 23:00 p.m.	0	0	0	1	0	0
2. LEWISTON	a) Sunday, Feb. 7						
	18:00 p.m. – 19:00 p.m.	3	1	0	6	0	0
	19:00 p.m. – 20:00 p.m.	4	0	0	6	0	0
	20:00 p.m. – 21:00 p.m.	0	0	0	1	0	0
	21:00 p.m. – 22:00 p.m.	0	0	0	3	0	0
3. AMBASSADOR	a) Sunday, Feb. 7						
	18:00 p.m. – 19:00 p.m.	0	3	0	0	0	0
	19:00 p.m. – 20:00 p.m.	0	0	0	0	0	0
	20:00 p.m. – 21:00 p.m.	0	0	0	0	0	0
	21:00 p.m. – 22:00 p.m.	0	0	0	0	0	0
	b) Wednesday, Feb. 10						
	22:00 p.m. – 23:00 p.m.	0	0	0	4	0	0
	c) Thursday, Feb. 11						
	04:00 a.m. – 05:00 a.m.	0	0	0	0	1	0
	05:00 a.m. – 06:00 a.m.	7	0	0	2	0	0
	d) Friday, Feb. 12						
	04:00 a.m. – 05:00 a.m.	1	0	0	0	0	0
	05:00 a.m. – 06:00 a.m.	3	0	0	0	0	0
	e) Saturday, Feb. 13						
	04:00 a.m. – 05:00 a.m.	2	0	0	0	0	0
	05:00 a.m. – 06:00 a.m.	3	2	0	0	0	0
4. WINDSOR TUNNEL	a) Tuesday, Feb. 9						
	16:00 p.m. – 18:00 p.m.	3	0	2	0	0	2
	b) Thursday, Feb. 11						
	11:30 a.m. – 12:30 p.m.	2	0	0	5	5	2
5. IVY LEA	a) Thursday, Feb. 11						
	05:00 a.m. – 06:00 a.m.	0	0	0	1	0	0

Adjusted Waste Haulage Vehicle Counts

ESTIMATED WASTE VEHICLES IN WEEK OF MONITORING

		SUNDAY, FEBRUARY 7 - MONDAY, FEBRUARY 8									MONDAY, FEBRUARY 8 - TUESDAY, FEBRUARY 9									TUESDAY, FEBRUARY 9 - WEDNESDAY, FEBRUARY 10								
		22.00 p.m. - 05:59 a.m.			06:00 a.m. - 13:59 p.m.			14:00 p.m. - 21:59 p.m.			22:00 p.m. - 05:59 a.m.			06:00 a.m. - 13:59 p.m.			14:00 p.m. - 21:59 p.m.			22:00 p.m. - 05:59 a.m.			06:00 a.m. - 13:59 p.m.			14:00 p.m. - 21:59 p.m.		
		C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total
BRIDGE/TRUCK TYPE	BRIDGE/TRUCK TYP																											
PEACE	PEACE																											
Single Trailer	Single Trailer	21.8	17.5	30.6	47.0	17.0	55.5	37.0	33.0	53.5	38.0	28.0	52.0	45.0	33.0	61.5	28.0	46.0	51.0	20.0	14.0	27.0	38.0	19.0	47.5	22.0	20.0	32.0
Double Trailer	Double Trailer	0.0	0.4	0.2	0.0	1.0	0.5	0.0	0.0	0.0	0.0	4.0	2.0	0.0	2.0	1.0	1.0	2.0	2.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
Small	Small	0.5	0.4	0.7	0.0	0.0	0.0	2.0	1.0	2.5	1.0	0.0	1.0	0.0	0.0	0.0	2.0	1.0	2.5	0.0	0.0	0.0	1.0	1.0	1.5	5.0	0.0	5.0
TOTAL	TOTAL	22.4	18.2	31.5	47.0	18.0	56.0	39.0	34.0	56.0	39.0	32.0	55.0	45.0	35.0	62.5	31.0	49.0	53.5	20.0	14.0	27.0	40.0	20.0	50.0	27.0	20.0	37.0
LEWISTON	LEWISTON																											
Single Trailer	Single Trailer	3.0	12.0	9.0	15.0	15.0	22.5	13.0	25.0	25.5	13.0	5.0	15.5	14.0	11.0	19.5	16.0	13.0	23.5	7.0	3.0	8.5	13.0	11.0	18.5	24.0	13.0	30.5
Double Trailer	Double Trailer	0.0	3.0	1.5	1.0	1.0	1.5	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
Small	Small	1.0	3.0	2.5	6.0	1.0	6.5	2.0	0.0	2.0	0.0	0.0	0.0	3.0	0.0	3.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0
TOTAL	TOTAL	4.0	18.0	13.0	22.0	17.0	30.5	15.0	26.0	28.0	13.0	5.0	15.5	17.0	11.0	22.5	18.0	15.0	25.5	7.0	3.0	8.5	16.0	11.0	21.5	24.0	13.0	30.5
AMBASSADOR	AMBASSADOR																											
Single Trailer	Single Trailer	9.0	6.0	12.0	25.0	11.0	30.5	1.0	6.0	4.0	9.0	2.0	10.0	26.0	9.0	30.5	10.0	5.0	12.5	5.0	6.0	8.0	42.0	3.0	43.5	5.0	4.0	7.0
Double Trailer	Double Trailer	1.0	4.0	3.0	2.0	0.0	2.0	0.0	4.0	2.0	0.0	1.0	0.5	10.0	0.0	10.0	2.0	0.0	2.0	1.0	0.0	1.0	4.0	1.0	4.5	0.0	0.0	0.0
Small	Small	0.0	0.0	0.0	7.0	0.0	7.0	4.0	0.0	4.0	0.0	0.0	0.0	7.0	0.0	7.0	2.0	0.0	2.0	0.0	0.0	0.0	6.0	0.0	6.0	3.0	0.0	3.0
TOTAL	TOTAL	10.0	10.0	15.0	34.0	11.0	39.5	5.0	10.0	10.0	9.0	3.0	10.5	43.0	9.0	47.5	14.0	5.0	16.5	6.0	6.0	9.0	52.0	4.0	54.0	8.0	4.0	10.0
BLUEWATER	BLUEWATER																											
Single Trailer	Single Trailer	5.0	3.5	6.8	14.0	6.5	17.2	0.6	3.5	2.3	5.0	1.2	5.6	14.6	3.3	17.2	5.6	3.0	7.1	2.8	3.5	4.6	23.5	1.8	24.4	2.8	2.4	4.0
Double Trailer	Double Trailer	0.6	2.4	1.7	1.1	0.0	1.1	0.0	2.4	1.2	0.0	0.6	0.3	5.6	0.0	5.6	1.1	0.0	1.1	0.6	0.0	0.6	2.2	0.6	2.5	0.0	0.0	0.0
Small	Small	0.0	0.0	0.0	3.9	0.0	3.9	2.2	0.0	2.2	0.0	0.0	0.0	3.9	0.0	3.9	1.1	0.0	1.1	0.0	0.0	0.0	3.4	0.0	3.4	1.7	0.0	1.7
TOTAL	TOTAL	5.6	5.9	8.6	19.0	6.5	22.3	2.8	5.9	5.8	5.0	1.8	5.9	24.1	5.3	26.7	7.8	3.0	9.3	3.4	3.5	5.1	29.1	2.4	30.3	4.5	2.4	5.7
WINDSOR TUNNEL	WINDSOR TUNNEL																											
Single Trailer	Single Trailer	9.0	6.0	12.0	25.0	11.0	30.5	1.0	6.0	4.0	9.0	2.0	10.0	26.0	9.0	30.5	10.0	5.0	12.5	5.0	6.0	8.0	42.0	3.0	43.5	5.0	4.0	7.0
Double Trailer	Double Trailer	1.0	4.0	3.0	2.0	0.0	2.0	0.0	4.0	2.0	0.0	1.0	0.5	10.0	0.0	10.0	2.0	0.0	2.0	1.0	0.0	1.0	4.0	1.0	4.5	0.0	0.0	0.0
Small	Small	0.0	0.0	0.0	7.0	0.0	7.0	4.0	0.0	4.0	0.0	0.0	0.0	7.0	0.0	7.0	2.0	0.0	2.0	0.0	0.0	0.0	6.0	0.0	6.0	3.0	0.0	3.0
TOTAL	TOTAL	10.0	10.0	15.0	34.0	11.0	39.5	5.0	10.0	10.0	9.0	3.0	10.5	43.0	9.0	47.5	14.0	5.0	16.5	6.0	6.0	9.0	52.0	4.0	54.0	8.0	4.0	10.0
IVY LEA	IVY LEA																											
Single Trailer	Single Trailer	0.0	6.2	3.1	0.0	7.9	4.0	0.0	10.8	5.4	0.0	5.8	2.9	0.0	9.3	4.7	0.0	11.0	5.5	0.0	4.2	2.1	0.0	5.6	2.8	0.0	6.3	3.1
Double Trailer	Double Trailer	0.0	1.6	0.8	0.0	0.3	0.2	0.0	1.2	0.6	0.0	0.9	0.4	0.0	0.3	0.2	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0
Small	Small	0.0	0.5	0.3	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0
TOTAL	TOTAL	0.0	8.3	4.2	0.0	8.4	4.2	0.0	12.1	6.1	0.0	6.7	3.3	0.0	9.6	4.8	0.0	11.5	5.8	0.0	4.2	2.1	0.0	6.0	3.0	0.0	6.3	3.1
CORNWALL,PRESC	CORNWALL,PRESCOTT																											
Single Trailer	Single Trailer	0.0	5.0	2.5	0.0	6.3	3.2	0.0	8.6	4.3	0.0	4.6	2.3	0.0	7.5	3.7	0.0	8.8	4.4	0.0	3.4	1.7	0.0	4.5	2.2	0.0	5.0	2.5
Double Trailer	Double Trailer	0.0	1.2	0.6	0.0	0.3	0.1	0.0	0.9	0.5	0.0	0.7	0.4	0.0	0.3	0.1	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0
Small	Small	0.0	0.4	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
TOTAL	TOTAL	0.0	6.7	3.3	0.0	6.7	3.4	0.0	9.7	4.9	0.0	5.3	2.7	0.0	7.7	3.9	0.0	9.2	4.6	0.0	3.4	1.7	0.0	4.8	2.4	0.0	5.0	2.5
GRAND TOTAL	GRAND TOTAL	52.0	77.1	90.5	156.0	78.6	195.3	66.8	107.8	120.7	75.0	56.8	103.4	172.1	86.7	215.4	84.8	97.7	133.7	42.4	40.2	62.5	189.1	52.1	215.2	71.5	54.7	98.8

	WEDNESDAY, FEBRUARY 10 - THURSDAY, FEBRUARY 11									THURSDAY, FEBRUARY 11 - FRIDAY, FEBRUARY 12									FRIDAY, FEBRUARY 12 - SATURDAY, FEBRUARY 13								
	22.00 p.m. - 05:59 a.m.			06:00 a.m. - 13:59 p.m.			14.00 p.m. - 21:59 p.m.			22:00 p.m. - 05:59 a.m.			06.00 a.m. - 13:59 p.m.			14.00 p.m. - 21:59 p.m.			22.00 p.m. - 05:59 a.m.			06:00 a.m. - 13:59 p.m.			14.00 p.m. - 21:59 p.m.		
	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total	C	P	Total
BRIDGE/TRUCK TYP																											
PEACE																											
Single Trailer	16.9	18.9	26.4	39.0	25.0	51.5	26.0	29.0	40.5	13.5	10.2	18.6	34.0	12.0	40.0	18.0	17.0	26.5	2.3	2.5	3.6	8.0	5.0	10.5	1.0	2.0	2.0
Double Trailer	0.5	0.4	0.7	1.0	0.0	1.0	1.0	1.0	1.5	0.3	0.0	0.3	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.8	0.7	1.1	2.0	0.0	2.0	1.0	2.0	2.0	1.5	0.4	1.5	4.0	1.0	4.5	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	18.2	20.0	28.2	42.0	25.0	54.5	28.0	32.0	44.0	15.1	10.5	20.3	39.0	13.0	45.5	19.0	17.0	27.5	2.3	2.5	3.6	8.0	5.0	10.5	1.0	2.0	2.0
LEWISTON																											
Single Trailer	11.4	2.7	15.3	38.0	8.0	42.0	6.0	14.0	13.0	7.8	8.1	11.8	23.0	14.0	30.0	7.0	9.0	11.5	1.0	1.1	1.6	3.0	3.0	4.5	1.0	0.0	1.0
Double Trailer	0.3	0.0	0.3	1.0	0.0	1.0	0.0	0.0	0.0	0.3	0.0	0.3	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	2.9	1.1	3.4	7.0	3.0	8.5	4.0	0.0	4.0	0.8	1.8	1.7	2.0	5.0	4.5	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	14.6	8.8	18.9	46.0	11.0	51.5	10.0	14.0	17.0	8.8	9.8	13.7	26.0	19.0	35.5	8.0	9.0	12.5	1.0	1.1	1.6	3.0	3.0	4.5	1.0	0.0	1.0
AMBASSADOR																											
Single Trailer	8.8	3.5	10.6	30.0	4.0	32.0	4.0	6.0	7.0	6.2	2.5	7.5	23.0	3.0	24.5	1.0	4.0	3.0	1.0	1.1	1.6	3.0	3.0	4.5	1.0	0.0	1.0
Double Trailer	2.1	1.4	2.8	8.0	4.0	10.0	0.0	0.0	0.0	1.0	0.0	1.0	4.0	0.0	4.0	0.0	0.0	0.0	0.8	0.0	0.8	3.0	0.0	3.0	0.0	0.0	0.0
Small	1.8	0.4	2.0	6.0	1.0	6.5	1.0	0.0	1.0	1.3	0.0	1.3	4.0	0.0	4.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	12.7	5.3	15.4	44.0	9.0	48.5	5.0	6.0	8.0	8.6	2.5	9.8	31.0	3.0	32.5	2.0	4.0	4.0	1.8	1.1	2.3	6.0	3.0	7.5	1.0	0.0	1.0
BLUEWATER																											
Single Trailer	7.3	3.2	8.9	24.0	4.0	26.0	4.0	5.0	6.5	3.1	1.1	3.6	12.0	1.0	12.5	0.0	2.0	1.0	0.6	0.6	0.9	1.7	1.8	2.6	0.6	0.0	0.6
Double Trailer	0.5	0.4	0.7	2.0	0.0	2.0	0.0	1.0	0.5	1.0	0.0	1.0	3.0	0.0	3.0	1.0	0.0	1.0	0.4	0.0	0.4	1.7	0.0	1.7	0.0	0.0	0.0
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	7.8	3.5	9.6	26.0	4.0	28.0	4.0	6.0	7.0	4.2	1.1	4.7	15.0	1.0	13.3	1.0	2.0	2.0	1.0	0.6	1.3	3.4	1.8	4.2	0.6	0.0	0.6
WINDSOR TUNNEL																											
Single Trailer	8.8	3.5	10.6	30.0	4.0	32.0	4.0	6.0	7.0	6.2	2.5	7.5	23.0	3.0	24.5	1.0	4.0	3.0	1.0	1.1	1.6	3.0	3.0	4.5	1.0	0.0	1.0
Double Trailer	2.1	1.4	2.8	8.0	4.0	10.0	0.0	0.0	0.0	1.0	0.0	1.0	4.0	0.0	4.0	0.0	0.0	0.0	0.8	0.0	0.8	3.0	0.0	3.0	0.0	0.0	0.0
Small	1.8	0.4	2.0	6.0	1.0	6.5	1.0	0.0	1.0	1.3	0.0	1.3	4.0	0.0	4.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	12.7	5.3	15.4	44.0	9.0	48.5	5.0	6.0	8.0	8.6	2.5	9.8	31.0	3.0	32.5	2.0	4.0	4.0	1.8	1.1	2.3	6.0	3.0	7.5	1.0	0.0	1.0
IVY LEA																											
Single Trailer	0.0	5.3	2.7	0.0	16.0	8.0	0.0	1.0	0.5	0.0	3.5	1.7	0.0	4.8	2.4	0.0	5.1	2.6	0.0	0.8	0.4	0.0	2.0	1.0	0.0	0.3	0.2
Double Trailer	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	6.0	3.0	0.0	16.0	8.0	0.0	1.0	0.5	0.0	3.8	1.9	0.0	5.8	2.9	0.0	5.1	2.6	0.0	0.8	0.4	0.0	2.0	1.0	0.0	0.3	0.2
CORNWALL,PRESC																											
Single Trailer	0.0	4.3	2.1	0.0	12.8	6.4	0.0	0.8	0.4	0.0	2.8	1.4	0.0	3.8	1.9	0.0	4.1	2.0	0.0	0.7	0.3	0.0	1.6	0.8	0.0	0.3	0.1
Double Trailer	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	4.8	2.4	0.0	12.8	6.4	0.0	0.8	0.4	0.0	3.0	1.5	0.0	4.6	2.3	0.0	4.1	2.0	0.0	0.7	0.3	0.0	1.6	0.8	0.0	0.3	0.1
GRAND TOTAL	66.0	53.5	92.8	202.0	86.8	245.4	52.0	65.8	84.9	45.2	33.1	61.8	142.0	49.4	166.7	32.0	45.3	54.6	8.0	7.7	11.9	26.4	19.4	36.1	4.6	2.6	5.8

	SATURDAY, FEBRUARY 13 - SUNDAY, FEBRUARY 14									TOTAL WEEK		
	22.00 p.m. - 05.59 a.m.			06:00 a.m. - 13:59 p.m.			14.00 p.m. - 21:59 p.m.					
	C	P	Total	C	P	Total	C	P	Total	Confirmed	Possible	Adjusted Total
BRIDGE/TRUCK TYPE												
PEACE												
Single Trailer	2.1	2.5	3.6	8.0	3.0	10.5	1.0	2.0	2.0	467	358	646
Double Trailer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6	11	11
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22	7	25
TOTAL	2.3	2.5	3.6	8.0	3.0	10.5	1.0	2.0	2.0	494	377	683
LEWISTON												
Single Trailer	4.4	12.3	10.5	3.0	3.0	4.5	14.0	32.0	30.0	238	222	349
Double Trailer	0.5	0.0	0.5	0.0	0.0	0.0	2.0	0.0	2.0	7	5	10
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34	15	41
TOTAL	4.9	12.3	11.1	3.0	3.0	4.5	16.0	32.0	32.0	278	242	399
AMBASSADOR												
Single Trailer	0.8	1.1	1.3	3.0	3.0	4.5	0.0	0.0	0.0	214	83	255
Double Trailer	2.3	0.0	2.3	3.0	0.0	3.0	6.0	0.0	6.0	50	15	58
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44	1	45
TOTAL	3.1	1.1	3.6	6.0	3.0	7.5	6.0	0.0	6.0	308	100	358
BLUEWATER												
Single Trailer	0.4	0.6	0.7	1.2	1.8	2.6	0.0	0.0	0.0	129	52	155
Double Trailer	1.3	0.0	1.3	1.2	0.0	1.7	3.4	0.0	3.4	27	7	31
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16	0	16
TOTAL	1.7	0.6	2.1	3.4	1.8	4.2	3.4	0.0	3.4	173	59	202
WINDSOR TUNNEL												
Single Trailer	0.8	1.1	1.3	3.0	3.0	4.5	0.0	0.0	0.0	214	83	255
Double Trailer	2.3	0.0	2.3	3.0	0.0	3.0	6.0	0.0	6.0	50	15	58
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44	1	45
TOTAL	3.1	1.1	3.6	6.0	3.0	7.5	6.0	0.0	6.0	308	100	358
IVY LEA												
Single Trailer	0.0	2.6	1.3	0.0	2.0	1.0	0.0	5.4	2.7	0	116	58
Double Trailer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	5	3
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	3	1
TOTAL	0.0	2.6	1.3	0.0	2.0	1.0	0.0	5.4	2.7	0	124	62
CORNWALL,PRESC												
Single Trailer	0.0	2.1	1.0	0.0	1.6	0.8	0.0	4.4	2.2	0	93	46
Double Trailer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	4	2
Small	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	2	1
TOTAL	0.0	2.1	1.0	0.0	1.6	0.8	0.0	4.4	2.2	0	99	50
GRAND TOTAL	15.3	22.1	26.3	26.4	19.4	36.1	32.4	43.8	54.3	1,562	1,101	2,112

Appendix D

Contact List

A. U.S. State and County Waste Management Officials
B. U.S. Customs and Bridge Commissions
C. Ontario and Quebec Waste Management Officials
D. Private Waste Management Industry
E. Other Contacts

A. U.S. STATE AND COUNTY WASTE MANAGEMENT OFFICIALS

Illinois

Mr. Mike Nechvatal
Manager, Solid Waste
Management Section
Division of Land Pollution Control
Illinois Environmental Protection Agency
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Springfield, Illinois 62794–9276

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Mr. Lavoy Haagu
Supervisor, Solid Waste Section
Iowa Department of Natural Resources
900 East Grand Avenue
Henry A. Wallace Building
Des Moines, Iowa 50319–0034

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Indiana

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Indiana Department of Environmental
Management
Solid and Hazardous Waste
105 South Meridian Street
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Indianapolis, Indiana 46206

Tel: (317) 232–8603
Fax: (317) 232–3403

Kentucky

Ms. Sharon Stephens
Program Planning and Administration
Branch
Kentucky Department for Environmental
Protection
14 Reilly Road
Frankfort, Kentucky 40601

Tel: (502) 564–6716
Fax: (502) 564–4245

Mr. Mark Thomson
Supervisor, Permit Administration Section
Division of Waste Management
Department for Environmental Protection
Frankfort Office Park
18 Reilly Road
Frankfort, Kentucky 40601

Maine

Mr. Hartley Palleschi
Senior Planner
Maine Waste Management Agency
State House Station 17
Augusta, Maine 04333

Tel: (207) 287–5300

Massachusetts

Mr. Jerry Lambert
Massachusetts Department of
Environmental Protection
Division of Solid Waste Management
Bureau of Waste Prevention
One Winter Street
4th Floor
Boston, Massachusetts 02108

Tel: (617) 292–5979

Michigan

Mr. Carl Zollner
Chief Technical Services Branch
Waste Management Division
Michigan Department of
Natural Resources (MDNR)
P.O. Box 30241
Lansing, Michigan 48909

Tel: (517) 335–3293

Mr. Seth Philips
Head, Waste Management Unit
MDNR

Tel: (517) 373–4750

Ms. F. McCormick
Administrator, Solid Waste Management
Wayne County Public Works Department

Tel: (313) 224–3635
Fax: (313) 224–0045

Mr. Dan Miyer
Public Works Department
Washingtonwa County, Michigan

Tel: (313) 994–2398

Mr. Jim Baumgartner
Public Works Department
McComb County, Michigan

Tel: (313) 469–5285

Mr. Elwin Johnson
Public Works Department
Jackson County, Michigan

Tel: (517) 788–4447

Mr. Gordon Ruttan
Planning Director
County Planning Commission
St. Clair County
108 Morran Blvd.
Port Huron, Michigan 48060

Tel: (313) 987–4884
Fax: (313) 985–2250

Ms. Sue Weber
Chairperson, Solid Waste Committee
6411 Rouget Road
Palmyra, Michigan 49268
Leniway County

Tel: (517) 263–2068

Mr. John Cambell
Planning and Development Commission
Chippawa County, Mighigan

Tel: (906) 635–1581

Minnesota

Mr. Art Dunn
Chief, Solid Waste Section
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155

Tel: (612) 296–7340

Missouri

Mr. Hae Morton
Director, Solid Waste Section
Environmental Quality Division
Missouri Department of Natural Resources
205 Jefferson Street
Jefferson City, Missouri 55155

Tel: (314) 751–5401
Fax: (314) 751–7869

New Hampshire

Mr. Parker Morgan
Supervisor, Planning Bureau
Waste Management Division
New Hampshire Department of
Environmental Services
6 Hazen Drive
Concord, New Hampshire 03301–6509

Tel: (603) 271–3713

New Jersey

Mr. Gie Mueller
Supervisor, Division of Solid Waste
Management
New Jersey Department of Environmental
Protection
840 Bear Tavern Road
CN 414
Trenton, New Jersey 08625

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New York

Mr. Norman Nosenchuck
Director, Division of Solid Waste
New York State Department of
Environmental Conservation (DEC)
Albany, New York 12233–4010

Tel: (518) 457–6603

Mr. Tom Lynch
Supervisor Technical Support Section
Bureau of Facility Management
Division of Solid Waste
New York State DEC
Albany, New York

Tel: (518) 485–5856

Mr. Bob Becker
Director of Solid Waste
City of Auburn, New York

Tel: (315) 255–4123

Mr. Peter Buechi
Regional Solid and Hazardous
Waste Engineer
(Buffalo Area), Region 9
New York State
DEC

Mr. Eugene Klara
(Syracuse Area) Region 7
New York State
DEC

Tel: (315) 426–7400

Mr. Pat Concanon
Region 8
New York State
DEC

Tel: (716) 226–2466

Ohio

Ms. Carolyn Watkins
Planning Section Manager
Ohio Environmental Protection Agency
Division of Solid and Infectious
Waste Management
1800 Water Mark Drive
P.O. Box 1049
Columbus, Ohio 43266–0149

Tel: (614) 644–2826
Fax: (614) 644–2329

Mr. John Watkins
North East District
Ohio Environmental Protection Agency

Tel: (216) 425–9171

Pennsylvania

Ms. Sally Lohman
Environmental Planner
Bureau of Waste Management
Division of Waste Minimization
and Planning
Department of Environmental Resources
Commonwealth of Pennsylvania
Fulton Bank Building
5th Floor
Harrisburg, PA 17101

Tel: (717) 787-7382
Fax: (717) 787-1904

Tennessee

Mr. Frank Victory
Chief, Solid Waste Management Unit
Division of Solid Waste Management
Tennessee Department of Health
and Environment
701 Broadway
Customs House, 4th Floor
Nashville, Tennessee 37247-3530

Tel: (615) 532-0780

Virginia

Mr. Wladimir Gulevich
Director, Division of Technical Services
Department of Waste Management
101 North 14th Street
11th Floor
Richmond, Virginia 23219

Tel: (804) 225-2466

Vermont

Mr. Al Morison
Administrative Officer
Solid Waste Management Division
Dept. of Environmental Conservation
103 South Main Street
Waterburg, Vermont 05671-0407

Tel: (802) 244-7831

West Virginia

Mr. Bill Rheinlander
Public Information Supervisor
Waste Management Section
Division of Natural Resources
West Virginia Department of Commerce,
Labor and Environmental Resources
1356 Hansford Street
Charleston, West Virginia 25301

Tel: (304) 558-5929

Wisconsin

Ms. Lakshmi Sridharan
Chief, Solid Waste Management Section
Wisconsin Department of Natural
Resources
Bureau of Solid and Hazardous Waste
Management
P.O. Box 7921
Madison, Wisconsin 53707

Tel: (608) 266-0520
Fax: (608) 267-2768

B. U.S. CUSTOMS AND BRIDGE COMMISSIONS

U.S. CUSTOMS

- Mr. Joe Cichocki
  U.S. Customs OAS/JIRU
  Peace Bridge Plaza
  Buffalo, New York 14213

  Tel: (716) 846–3063
  Fax: (716) 846–3066

- Mr. William Morandini
  United States Customs Service
  District Director of Customs
  477 Michigan Avenue
  2nd Floor
  Detroit, Michigan 48226

  Tel: (313) 226–3180
  Fax: (313) 226–3179

- Mr. William Dietzel
  United States Customs Service
  District Director of Customs
  127 North Water Street
  Ogdensburg, New York 13669

  Tel: (315) 393–0660
  Fax: (315) 393–7472

- Mr. Richard McMullan
  United States Customs Service
  District Director of Customs
  111 West Huron Street
  Room 603
  Buffalo, New York 14202

  Tel: (716) 846–4373
  Fax: (716) 846–5011

BRIDGE COMMISSIONS

- Mr. David Young
  Superintendent – Peace Bridge
  Buffalo and Fort Erie Public
  Bridge Authority
  Peace Bridge Plaza
  Fort Erie, Ontario
  L2A 1S8

  Tel: (716) 884–6744
  Fax: (716) 884–2089

- Mr. Ronald Lampman
  Secretary / Treasurer, Board of Directors
  Buffalo and Fort Erie Public
  Bridge Authority
  Peace Bridge Plaza
  Fort Erie, Ontario
  L2A 1S8

  Tel: (716) 884–6744
  Fax: (716) 884–2089

- Mr. Allen Gandell
  General Manager
  Niagara Falls Bridge Commission
  P.O. Box 395
  Niagara Falls, Ontario
  L2E 6T8

  Tel: (416) 354–5641
  Fax: (416) 354–3256

- Mr. Ken Jarvela
  The Bluewater Bridge Authority
  1 Bridge Street
  Point Edward, Ontario
  N7V 4J5

  Tel: (519) 336–2720
  Fax: (519) 336–7622

- Mr. Dan Stamper
  President
  The Canadian Transit Company
  712 Huron Church Road
  Windsor, Ontario
  N9C 2K2

  Tel: (519) 255–1515
  Fax: (313) 496–1166

- Mr. Russ Wilcox
  Thousand Islands Bridge Authority
  P.O. Box 10
  Lansdowne, Ontario
  K0E 1L0

  Tel: (315) 482–2501
  Fax: (315) 482–5925

C. ONTARIO AND QUEBEC WASTE MANAGEMENT OFFICIALS

Metropolitan Toronto

- Mr. W.G. Crowther
  Assistant Director
  Planning, Control and Development
  Metropolitan Works Department

  Tel: (416) 392–8256

- Mr. Angelos Bacopoulos
  Assistant Director – Operations
  Solid Waste Management Division
  Metropolitan Works Department

  Tel: (416) 392–8831

The Regional Municipality of Peel

- Mr. Glenn Williams
  Manager, Waste Reduction and Recovery
  and
  Ms. Christine Chalmers
  Acting Supervisor, Waste Reduction and Recovery
  Waste Management Division

  Tel: (416) 791–9400

Regional Municipality of Halton

- Ms. Pat Torrence
  Public Works Department and
  Mr. Gerrit Buitenhuis
  Site Manager, Halton Landfill
  Regional Municipality of Halton

  Tel: (416) 825–6000

The Regional Municipality of Durham

- Ms. Sue Crowley–Campbell
  Recycling Operations Supervisor
  Region of Durham Works Department

  Tel: (416) 579–5264

The Regional Municipality of Ottawa–Carleton

- Mr. Joe Hall
  IC&I Coordinator
  Environmental Services Department

  Tel: (613) 560–6065 ext. 2729

The Regional Municipality of Waterloo

- Mr. Dan Balfour
  Manager, Waste Reduction
  Regional Municipality of Waterloo

  Tel: (519) 885–9776

The Regional Municipality of Hamilton–Wentworth

- Mr. Rik Podolsky
  Environmental Services Department

  Tel: (416) 546–4417

County of Essex

- Mr. Ron McConnel
  Essex–Windsor Waste Management Committee
  360 Fairview Ave. West.
  Essex, Ontario
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  Tel: (519) 776–6441
  Fax: (519) 776–4455

City of Kingston

- Mr. G. deLugt
  Acting Commissioner of Works
  City of Kingston

  Tel: (613) 546–4291

City of Sault Ste. Marie

- Mr. Jim Elliott
  Environmental Engineer
  Sault Ste. Marie

  Tel: (705) 759-2500

City of Niagara Falls

- Mr. Dave Perry
  Sanitation and Sewer Superintendent

  Tel: (416) 356-1355

Central Region – Ministry of Environment and Energy

- Ms. Sharon Hogan
  District Officer

  Tel: (416) 424-3000

- Mr. Gary Boretski
  York-Region District Office
  Durham Office

  Tel: (416) 467-3027

- Mr. Ron Brooks
  York-Region District Office
  York Office

  Tel: (416) 467-3026

- Mr. Daryl Hogg
  Toronto District Office
  Abatement West

  Tel: (416) 467-3013

Investigations and Enforcement Branch – Ministry of Environment and Energy

- Mr. Jim Thompson
  Area Supervisor (Acting) and
  Mr. Chris Williams
  Investigative Support Services

  Tel: (416) 440-3538

Province of Quebec

- Mr. Abdallah Bourgiing
  Ministere de L'Environment
  170 rue Hotel Le Ville, 7.350
  Hull, Quebec
  J8X 4C2

  Tel: (819) 772-3434
  Fax: (819) 772-3952

D. PRIVATE WASTE MANAGEMENT INDUSTRY

- Mr. John Feenster
  MaGill Landfill
  (owned by Philip)
  3895 MaGill Road
  Jackson, Michigan 49201

  Tel: (517) 789–9871
  Fax: (517) 789–6916

- Mr. Dave Donagan
  President, Liberty Environmental
  7900 South Meridian
  Clark Lake, Michigan 49234

  Tel: (517) 787–1177
  Fax: (517) 789–6916

- Mr. Bob Line
  Browning Ferris Industries
  Arbour Hills Landfill
  10690 West Six Mile
  Northville, Michigan 48167

  Tel: (313) 349–7230
  Fax: (313) 347–9899

- Mr. Micheal Sousa
  Business Manager
  Occidental Incinerator
  Niagara Falls, New York

  Tel: (716) 278–7777
  Fax: (716) 278–7467

- Mr. Ed Wetherall
  Riverview Landfill
  Riverview, Michigan

  Tel: (313) 281–4263

- Mr. Greg Carpenter
  Vice–President
  Pinetree Acres Incorporated
  26600 29 Mile Road
  Lennox, Michigan 48048

  Tel: (313) 749–6306

- Mr. Gary S. Smith
  President
  Modern Landfill
  P.O. Box 209
  Model City, New York 14107

  Tel: (716) 754–8226 ext.208
  Fax: (716) 759–8964

- Mr. John Casaccia
  Seneca Meadows Landfill
  New York

  Tel: (315) 539–5624
  Fax: (315) 539–3097

- Mr. Bob Willis
  Laidlaw Landfill
  Adrian County, Michigan

  Tel: (517) 263–7080
  Fax: (517) 265–3637

- Mr. Tim Harrow
  Dafter Landfill
  Chippawa County, Michigan

  Tel: (906) 632–8055

- Mr Steve Balagan or
  Mr. Steve Sharp
  City Management
  3400 East Laffaette
  Detroit Michigan 48207
  (Wayne County)

  Tel: (313) 567–4700

- Mr. Qunito De Filipi
  Al's Waste Control
  Toronto, Ontario

  Tel: (416) 675–7285
  Fax: (416) 675–2088

- Mr. Dan McKenzie
  L.W. Sanderson
  Brampton, Ontario

  Tel: (416) 457–1734
  Fax: (416) 452–9786

- Mr. Ira Greenspoon
  President
  Canadian Eagle Recyclers

  Tel: (416) 792–2209
  Fax: (416) 458–4149

- Mr. John MacKay
  Manager, Waste Reduction and Recycling
  Walker Industries
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- Ms. Nancy Crawford
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- Mr. Martin Irish
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  L5C 1T5

  Tel: (416) 277–1494
  Fax: (416) 277–4463

E. OTHER CONTACTS

- Mr. Micheal Beebe
  Buffalo News

  Tel: (716) 849–3434

- Mr. Mike Collins
  Legislative Assistant to Congressman
  Bill Paxon
  United States Congress
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  1314 Longworth Avenue
  Washington, D.C. 21051

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  Fax: (202) 225–5910

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  Legislative Assistant to Senator
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  Washington, D.C.

  Tel: (202) 224–6542

- Senator John Glen
  Senate Committee on Government
  Affairs
  United States Senate
  SD–240
  Washington, D.D. 00510

  Assistant: Mr. Brian Duddlebock

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  Tel: (202) 659–4613

- Mr. Barry Shanoff
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  Tel: (301) 587–6300

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  Ms. Lynn Patenaude
  Environment Canada
  Solid Waste Management Division
  Office of Waste Management
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  241 Cite des Jeunes
  Hull, Quebec
  K1A 0H3

  Tel: (819) 953–0616

Appendix E

Data Updates Received after March 1993

A. Correspondence from Kentucky Department of Environmental Protection
B. Correspondence from Ohio Environmental Protection Agency
C. Golden Horseshoe Area Landfill Tipping Fee Update

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

February 9, 1993

RECEIVED
FEB 10 1993
GARTNER LEE

Mr. K. A. Jones
Gartner Lee
140 Renfrew Drive
Suite 102
Markham, Ontario L3R 8B6

RE: Open Records Request

Dear Mr. Jones:

I am in receipt of your open records request dated February 3, 1993 regarding the Fourth Quarter Reports for Graves County Landfill in Graves County.

I have conducted a file search and have located the Fourth Quarter Report for this facility. I have enclosed the Fourth Quarter Report for your convenience.

Should you have any questions, or require further information, please feel free to contact me at (502) 564-6716.

Sincerely,

Sharon Stephens

Sharon Stephens
Records Custodian

RECEIVED
JAN [illegible] 1993
DIVISION OF WASTE MANAGEMENT
SOLID WASTE BRANCH

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
18 REILLY ROAD
FRANKFORT, EKNTUCKY 40601
TELEPHONE NUMBER: (502) 564-6716

QUARTERLY LANDFILL WASTE QUANTITY REPORT

DEP 7046 (Revised 11-90)

SITE NAME Graves Co. Landfill

PERMIT NUMBER 042.07

4th Quarter, 19 92

DATE PREPARED Jan. 5, 93

REPORT PREPARED FOR THE MONTHS OF October, November, & December 19 92

MONTH	SOURCE(s)	TONS	SOURCE(s)	TONS
Oct 92	Graves	1796.41		
Oct 92	Calloway	44.49		
Oct 92	Lyon	9.93		
			In-State Industrial Waste Total (from DEP 7045)	
			Out-of-State Industrial Waste Total (from DEP 7045)	
			MONTHLY TOTAL	1851

MONTH	SOURCE(s)	TONS	SOURCE(s)	TONS
Nov. 92	Graves	1760.9	Fulton *	16.903
Nov. 92	Calloway	32.06	Marshall *	36.56
Nov. 92	Lyon	16.09	Livingston *	9
Nov. 92	McCracken *	1070.43	In-State Industrial Waste Total (from DEP 7045)	
Nov. 92	Massac * IL	13.31	Out-of-State Industrial Waste Total (from DEP 7045)	
			MONTHLY TOTAL	3109

MONTH	SOURCE(s)	TONS	SOURCE(s)	TONS
Dec. 92	Graves	1254.08	[illegible] * IL	142.62
Dec 92	Calloway	32.94	Marshall	87.7
Dec 92	Lyon	29.67	Livingston	36.24
Dec 92	McCracken	53.55	In-State Industrial Waste Total (from DEP 7045)	
Dec 92	Massac IL	26.62	Out-of-State Industrial Waste Total (from DEP 7045)	
			MONTHLY TOTAL	

Identify any new source of waste received with an asterick*.
If additional pages are needed, attach as necessary.
Forward two copies of this form:
Division of Waste management, Solid Waste Branch, 18 Reilly Road, Frankfort, Kentucky 40601

Page ___ of ___

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
18 REILLY ROAD
FRANKFORT, EKNTUCKY 40601
TELEPHONE NUMBER: (502) 564-6716

QUARTERLY LANDFILL WASTE QUANTITY REPORT
DEP 7046 (Revised 11-90)

SITE NAME Graves Co. Landfill PERMIT NUMBER 042.07

4th Quarter, 19 92 DATE PREPARED Jan. 5, 93

REPORT PREPARED FOR THE MONTHS OF October, November, & December 19 92

MONTH	SOURCE(s)	TONS	SOURCE(s)	TONS
			In-State Industrial WasteTotal (from DEP 7045)	
			Out-of-State Industrial WasteTotal (from DEP 7045)	
			MONTHLY TOTAL	

MONTH	SOURCE(s)	TONS	SOURCE(s)	TONS
			In-State Industrial WasteTotal (from DEP 7045)	
			Out-of-State Industrial WasteTotal (from DEP 7045)	
			MONTHLY TOTAL	

MONTH	SOURCE(s)	TONS	SOURCE(s)	TONS
Dec 92	Crittenden *	484.01		
Dec 92	Carlisle *	1264		
Dec 92	Caldwell *	35		
Dec. 92	Fulton	672.9	**In-State** Industrial WasteTotal (from DEP 7045)	
			Out-of-State Industrial WasteTotal (from DEP 7045)	
			MONTHLY TOTAL	2936

Identify any new source of waste received with an asterick*.
If additional pages are needed, attach as necessary.
Forward two copies of this form:
Division of Waste management, Solid Waste Branch, 18 Reilly Road, Frankfort, Kentucky 40601

OhioEPA
State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

George V. Voinovich
Governor

Donald R. Schregardus
Director

RECEIVED
MAY 17 1993
GARTNER LEE

KAJ
c.c. CD

May 7, 1993

Kevin Jones and Catherine Dowling
Gartner Lee Limited
140 Renfrow Drive Suite 102
Markham, Ontario
CANADA L3R 8B6

Dear Mr. Jones and Ms. Dowling:

Ohio EPA is beginning to compile records of nonhazardous solid waste imports into our state from other states and Canada in 1992. These records are based on reports submitted by Ohio landfills and other solid waste facilities on April 15th. I promised to provide you with the 1992 figures on imports from Canada as soon as they were available. These figures are preliminary and may see some adjustment, since a few facilities have not yet submitted their reports. However, we believe that most or all imports from Canada are already reflected.

Ohio disposal facilities reported receiving 110,610 tons of solid waste from Canada in 1992, all originating in Ontario. The breakdown by receiving facility and type of waste is as follows:

American Landfill, Waynesburg, Stark County
50,234 tons general (municipal) solid waste
10,310 tons industrial solid waste

BFI Carbon-Limestone Landfill, Poland Township, Mahoning County 33,004 tons general solid waste
321 tons industrial solid waste

BFI Medical Waste Systems in Warren, Trumbull County
37 tons of general solid waste*
*This facility is an infectious waste incinerator whose license also permits it to receive noninfectious solid waste such as off-spec pharmaceuticals.

Laidlaw Williams County Landfill (northwest Ohio)
17,077 tons general solid waste
626 tons of industrial solid waste

I hope this information is helpful. You may contact me at (614) 644-2826 if you have any questions.

Sincerely,

Carolyn Watkins

Carolyn Watkins
Planning Section Manager
Division of Solid and Infectious Waste Management

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OhioEPA
State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

George V. Voinovich
Governor

Donald R. Schregardus
Director

ORIGIN OF SOLID WASTE IMPORTS INTO OHIO LANDFILLS AND INCINERATORS IN 1992

(preliminary estimates as of 5/4/93)

point of Origin:	1992 imports in tons:	increase/decrease since 1991:
New York	610,921	+86,300
Pennsylvania	439,325	-85,100
New Jersey	255,315	-46,100
Kentucky	144,037	+ 6,700
Ontario, CANADA	110,610	+79,400
Indiana	87,619	+27,200
West Virginia	45,679	+27,100
Michigan	31,510	-10,200
Connecticut	8,721	-13,700
Massachusetts	7,536	- 3,200
Virginia	4,847	+ 3,900
Maryland	2,550	- 250
Illinois	2,024	+ 1,570
Delaware	1,347	- 250
Maine	939	+ 800
Washington, DC	818	+ 700
New Hampshire	433	+ 433
Tennessee	263	+ 262
Rhode Island	134	- 180
Wisconsin	10	+ 10
Minnesota	4	+ 4
California	2	+ 2
Unknown*	43,773	+ 1,100
Total Imports:	1,799,417 tons**	+77,573 tons (+4%)

* Reported as out-of-state waste, but state of origin not specified

** We do not yet know the total tonnages disposed in Ohio in 1992, but we estimate that this number will be 10%-12% of the total, similar to 1990 and 1991.

States that Ohio received waste from in 1991, but not in 1992:
Georgia Mississippi Missouri

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C. GOLDEN HORSESHOE AREA LANDFILL TIPPING FEE UPDATE

Landfill Tipping Fees for Private Sector Waste Receipts at Landfill Sites in the Golden Horseshoe Area (as of June 1993)

Region	$/tonne
Durham Region (Brock West)	90
Hamilton–Wentworth	70 [1]
Region of Peel (Britannia)	80
York Region (Keele Valley)	90
Halton Region	150

Note: 1. Effective July 1, 1993

Appendix F

Bibliography

APPENDIX F

Bibliography

1. Internal Staff Report on Waste Movement through U.S. Customs, Buffalo District (Untitled). Prepared by U.S. Customs, OAS/JIRU, Peace Bridge Plaza, Buffalo, New York 14213.

2. Solid Waste Digest, Volume 2, November 11, November 1992.

3. "Subtitle D's Effects on Private Industry". Waste Age, April 1992, p. 267.

4. Opening Statement; Chairman John J. LaFalce, House Small Business Committee. Hearing on Cross–Boarder Transport of Solid Waste. October 1991.

5. Land Disposal Facility Quarterly Reports. Indiana Department of Environmental Management Office of Solid and Hazardous Waste Management.

6. Summary of Solid Waste Facility Data for Indiana 1991 Annual Report. Prepared by Indiana Department of Environmental Management. April 1992.

7. Average Landfill Tipping Fees for Municipal Solid Waste in Pennsylvania 1985–1991. Prepared by Commonwealth of Pennsylvania, Department of Environmental Resources. November 1992.

8. Internal Reports on "Disposal of Waste Originating in Canada; 1991 and 1992". Prepared by Commonwealth of Pennsylvania, Department of Environmental Resources. 1993.

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10. Landfill Tipping Fees 1990 Review. Prepared by the National Solid Wastes Management Association, 1991.

11. "Shipment of Solid Waste from Canada to the United States". Testimony of Norman H. Nosenchuck, Director, Division of Solid Waste, New York State Department of Environmental Conservation, Before Committee on Small Business, United States House of Representatives, Washington, D.C., October 31, 1991.

Appendix G

Glossary of Terms and Abbreviations